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**WORKING PAPERS**

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# **The Indonesian Family Planning Program**

## **An Economic Perspective**

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The intrauterine device (IUD) and (less so) the injectable are relatively cost-effective methods of contraception that could probably improve contraceptive prevalence. They both require capital investment and trained medical manpower — which are beyond the means and jurisdiction of Indonesia's family planning agency but would probably pay off, especially in improved health care.

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This paper is a product of the Population, Health, and Nutrition Division, Population and Human Resources Department of the World Bank, in cooperation with the Indonesian National Family Planning Coordinating Board, and the Ministry of Foreign Affairs of the Royal Government of the Netherlands. It is part of a larger effort in PRE to examine the economics of family planning. Copies are available free from the World Bank, 1818 H Street NW, Washington DC 20433. Please contact Otilia Nadora, room S6-065, extension 31091 (185 pages).

A comparative analysis of three provinces in Indonesia indicates that the IUD and, to less extent, the injectable, are methods that, if available, would probably be used and would contribute to high contraceptive prevalence.

Moreover, the IUD appears to be relatively cost-effective.

But the IUD (and to less extent the injectable) requires capital investment and trained medical manpower (which are beyond the means and control of Indonesia's National Family Planning Coordinating Board, BKKBN).

The relative delivery cost of different methods are inversely related to their efficacy —

so the most cost-effective methods are also the most efficient — probably also in terms of demographic impact. Differences in the mean age of users for the IUD (32.5), pill (30), and injectable (29) are slight — so reproductive potential and risk of pregnancy are about equal among different user groups.

Clearly, altering the delivery system — particularly in favor of methods that require medical facilities and staff — requires investment in facility, staff, and the cost of initiating a new method. This merits a detailed cost-benefit analysis, as the data strongly suggest that such investments might pay off, especially because they would also improve medical care.

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## EXECUTIVE SUMMARY

Indonesia has achieved one of the most impressive records in fertility reduction over the past two decades. The country's total fertility rate has declined from an estimated 5.5 in 1967 - 1970 to 3.4 in 1987. Population growth has been estimated at 2.1 percent during the eighties.

Many observers credit Indonesia's National Family Planning Coordinating Board (known by its acronym, BKKBN) as being instrumental in this fertility reduction and slowdown of population growth. BKKBN is a public sector organization responsible for planning and coordination of almost all family planning activities in Indonesia.

The study objective is to provide BKKBN and the Government of Indonesia with data that can help improve the cost-effectiveness of family planning delivery in Indonesia.

The study examines resource allocation, cost, funding institutions, and output of the program at grassroots level in selected regencies in three provinces: West Java, the Special District of Yogyakarta, and South Kalimantan. It is based on data about the program's field operations collected during November 1986 -- March 1987, and routine service statistics of BKKBN.

The six regencies participating in the study are case studies; they are not meant to represent the entire National Family Planning Program. Tangerang, in West Java is a densely-populated in-migration area next to the capital Jakarta. It has a high ratio of population to health facilities and other resources for family planning delivery. The Yogyakarta study areas, Kulon Progo and Bantul, are more traditional agricultural areas, close to a slow-growing urban center. They have a relatively strong social infrastructure and medical resources for family planning. These densely populated areas contrast with the study areas of South Kalimantan, Banjar, Barito Kuala, and Tapin, which are sparsely populated and have more resources per capita for family planning, but which are spread over large areas and are not easily accessible.

BKKBN operates in this diverse and quickly evolving social environment. Its activity is conditioned by four constraints: a) national administrative regulations, b) availability of medical and community resources, c) consumer demand, and d) BKKBN's budget. Regardless of area size, population, or other features which might influence resource allocation, BKKBN only has one family planning supervisor per administrative subdistrict. Medical and community resource constraints which influence the nature of the program are to a substantial degree external to BKKBN, which uses medical infrastructure controlled by the Ministry of Health. While BKKBN can advise about the supply, distribution, and administration of these resources, it exercises minimal control over them. These resources and consumer demand shape the nature of the program, exhibited in contraceptive method mix.

Availability of medical infrastructure per eligible couple (ELCO) varies

greatly between regions. One health center is available for about 9,500 eligible couples in Tangerang. This is twelve times the ratio of population to health facilities in the Kulon Progo regency of DI Yogyakarta, where there is one health center for each ELCO and fifty-five times that of sparsely-populated Tapin province of South Kalimantan where there is one health center for each ELCO. Medical personnel are also unevenly distributed. Different regions possess very different medical resources which are available for family planning. BKKBN must adopt modes of delivery and method mix accordingly.

Considerable variations are also observed across regions in the allocation of BKKBN staff. Tangerang's field workers are assigned to above 1,400 eligible couples, compared with about 1,200 in Yogyakarta, and 900 in South Kalimantan. Field workers in Tangerang handle far larger populations with fewer resources per ELCO than their counterparts in the other areas. Tangerang and Yogyakarta workers benefit, however, from a relatively high population density. At the same time, within each of these three provinces, allocation of field workers varies systematically with number of ELCOs, villages and size of catchment area. This is less the case in DI Yogyakarta and more so in Tangerang, where resources are relatively stretched.

BKKBN field workers oversee village family planning volunteer activities in the community. However, the volunteers who play a major role in outreach activities, primarily via distribution of pills and condoms, are not entirely answerable to BKKBN, in part because of other responsibilities they share in the community.

BKKBN staff spend most of their time searching for new acceptors and promoting family planning. The staff report working "by the book", which gives rise to the hypothesis that on the whole they may be underutilized. They do not seem to be under obvious pressure to respond to local variations in need.

There is a positive correlation across study areas between levels of all types of resources provision per eligible couple. The implication is that availability of medical infrastructure may be a key factor in the development and nature of the program.

Resource availability, and to an extent age of program, are reflected in prevalence rates and method mix. According to BKKBN's service statistics, both Tangerang and the South Kalimantan regencies have contraceptive prevalence rates of approximately 60 percent. Injectables, however, predominate in Tangerang and pills in South Kalimantan. The Yogyakarta regencies have the highest prevalence rates, around 80 percent, and the IUD is the most common method. Data on prevalence rates used in this study (from BKKBN sources) are higher than rates available from survey data; however, both types of data lead to the same implications because data on method mix is highly consistent amongst different sources.

The value of all resources allocated to family planning delivery ranges from about 270 Rps. (about \$0.18) per month per ELCO in densely-populated Tangerang to 630 Rps. in sparsely-populated South Kalimantan. BKKBN manages to mobilize an additional one rupiah from other government and community agencies, for each rupiah it invests in field operations. That is, BKKBN bears about 50



percent of family planning delivery costs, the Ministry of Health about 40 percent, and the community the remaining 10 percent. BKKBN bears less of the cost burden in areas where there is a medical infrastructure, because it does not pay full labor value for medical personnel and can rely on longer-lasting and less costly methods, notably the IUD. It is noteworthy that physicians and other medical staff, who report spending roughly 20 percent of their time on family planning activities, receive only 8 percent of their government income from BKKBN.

It is costliest, 900 Rps. per month, to maintain an average user in South Kalimantan. It is half that cost in Tangerang, the least costly area. The costs are higher and regional discrepancies wider when lower prevalence data from surveys are used. In all regions, especially those of South Kalimantan and Yogyakarta, scale of operations is a crucial variable influencing user cost. User cost is lower where operational units (field personnel) cover larger population and higher numbers of users. When scale of operation is controlled for and variable and marginal user costs are examined, D.I. Yogyakarta has the least costly type of program.

The IUD is the relatively more cost-effective method in the long run, followed by the injectable. These methods are probably also the most efficient when their efficacy, compliance and potential demographic impact are considered. The mean age of users of the IUD, pill, and injectable for Java and Bali is 32, 30, and 29 respectively, differences meaning almost identical risk of pregnancy. Moreover, comparative analysis of the three provinces indicates that the IUD and the injectable, are methods which, if made available, might be popular and contribute to high prevalence.

Major gains in cost-effectiveness can therefore be brought about primarily through altering contraceptive method mix in favor of the more permanent methods — the IUD and the injectable. While IUD delivery incurs low recurrent cost in labor and supplies, this method demands a relatively high investment in infrastructure, personnel, and start-up costs which, of course, are subject to substantial economies of scale. BKKBN, even if it manages supplies out of its own budget, cannot induce high IUD rates in any substantial manner without the required medical infrastructure and personnel. BKKBN has no direct control over these resources whatever consumer preferences may dictate.

The structure of user cost underscores the political economy of the family planning program. The major user cost component of the program, borne by BKKBN, is supplies, about two-thirds of BKKBN's cost in its field operations. This cost element is almost entirely influenced by method mix which, in turn, is to a substantial degree set by availability of medical infrastructure and personnel, and consumer demand. This means that BKKBN, the responsible agency has rather limited scope or latitude in terms of its own cost control, let alone the cost of the entire program.

A long-term cost-effectiveness strategy should therefore be considered within the context of the political economy of the Indonesian health and family planning system. It must combine investment in infrastructure, adoption of new family planning technology and modes of delivery, and influencing consumer demand. This can be done by the Government. Even if consumers pay the full

cost of IUD use, including recurrent capital cost, the private sector cannot be expected to finance at the outset the investment required to support IUD.

The proposition that the government supports clinically-based methods, at least in financing the investment, would be less acceptable on economic grounds in sparsely-populated areas such as South Kalimantan. There the injectable would be appropriate in the long-run as a relatively efficient method. This would require government support for training personnel. These arguments do not suggest that the government should refrain from supporting non-clinical methods, at least in the short run, according to conditions.

For its part, BKKBN might improve the cost-effectiveness of its operations and incur savings through modification of its target-setting policy, allocation of field workers, and improvement of workers' time use. BKKBN does control its labor cost, about one-fifth of total recurrent cost of the program's field operations, or one-third of BKKBN's own cost. The effects of apparent target-setting are observed throughout the analysis; there is a very high correlation between numbers of users and numbers of ELOCs across observations. This confounds sound evaluation of the field operations that can lead to better management of BKKBN's field resources.

Taken at face value, the data strongly suggest that the population and area assigned to the average field worker, could be extended since workers seem to operate under conditions of excess capacity; their catchment areas can be raised with no loss in production. This finding implies that present prevalence levels can be maintained, on the average, with fewer field staff, or more feasibly, that new field workers need not be added even though populations of eligible couples grow. In areas where the program is well-established and not too dependent on outreach activity, as in Yogyakarta, savings may be gained by reducing BKKBN's field staff and limiting their activity to information, education, and communication (IEC.)

Income-generating schemes serve areas with high prevalence rates, like Yogyakarta. Such a policy is consistent with the idea of rewards rather than inducement. There may be scope to transfer these funds as incentives in low prevalence areas, especially if there is excess production capacity and field worker productivity could be highest.

The study findings can help deal with the issue of shifting some of the financial burden of the program to the community, as implied by the KB Mandiri or privatization idea adopted by BKKBN.

The community bears about one-tenth of total delivery costs. This share increases in outreach activity. The pill and condoms are delivered almost exclusively through volunteer outlets. The share of the burden on the community is somewhat less in the case of the injectable because of the involvement of medical personnel. The contribution of the community is least in the case of delivery through medical facilities, such as in the case of the IUD or even the pill in South Kalimantan. The estimated monthly cost to service a pill user ranges from 450 - 600 Rps. Most labor and capital cost are borne by the community. The lion's share in cost of pill delivery, however, lies in its supply. Supplies' cost account for some 60 to 80 percent of total cost.

Even if clients pay under a private system the full cost of the pill, which is the major method to be affected under the KB Mandiri scheme, the net cost recovery from the community would be less than 100 percent in view of the community's current contribution. Any subsidy, most likely of supplies, would even further reduce net cost recovery from the community. A subsidy in the range of 10-30 percent, by conservative estimates, might not amount to a net cost recovery because roughly this cost is currently borne by the community.

As the program now stands, at least in the study areas, each community should possess a Village Contraceptive Distribution Center (VCDC) regardless of its physical, social, or economic environment. Under a private system, entrepreneurs may be able to make a profit in some communities but not in others. In this case, communities would receive differential advantages.

Privatization may differentially affect entire regions if the pill requires a fee and the IUD does not. DI Yogyakarta, a province with high IUD use, would be less penalized by a shift toward payment for pills than South Kalimantan, with its high pill use. Since DI Yogyakarta already enjoys advantages (particularly with regard to health infrastructure), assessing fees for pills, rather than IUDs, would increase its privileges even further. Charging for pills and not IUDs could aggravate regional disparities.

The cost recovery potential of IUD is higher than that of the pill. First, the community's contribution in IUD delivery is minimal: any charge for IUD delivery would therefore entail a net shift of burden from the government to the community. Second, the IUD is used by presumably better-off people who live close to health centers, and therefore may be able and willing to pay more than others. There is an additional reason: IUD fees are collected in clinics and may be applied towards financing community health facilities, whereas the pill is largely sold by non-medical outlets. No single universal cost recovery strategy may be appropriate across Indonesia.

The study clearly opens a broad research agenda. While the study is based on its own data collection efforts, it is clear that the analysis could have been based on a slightly modified data collection system other than BKKBN's current system, and an appropriate analytic infrastructure. The issues and implied programmatic changes all merit more focused research. Operations research into the allocation and activities of field workers should be high on the agenda.

A crucial element clearly missing in the data is the consumer's perspective. No strategy and programmatic change can be adequately assessed without regard to consumer response, especially in the diverse and fast changing demographic, economic and cultural environment of Indonesia.

## PREFACE

Cost-effectiveness in family planning delivery has become especially important in recent years in view of the slowed growth of public resources for family planning, at a time when the need for it remains pressing.

This study is part of an operational research work program in family planning initiated by the World Bank. Under this program, a quantitative economic approach with a cost-effectiveness orientation has been developed to assist policy-makers and program managers to learn from their own experience about resource allocation, cost, and finance, and how these relate to program objectives. The present work program included development of guidelines and studies of two distinct family planning programs: the Indonesian National Family Planning Program and the Colombian Profamilia Program. This study is of the Indonesian program.

The Indonesian Family Planning Program is well-established. The National Family Coordinating Board (BKKBN) is a public sector organization responsible for planning and coordination of almost all family planning activities in Indonesia. The study objective is to provide BKKBN and the Government of Indonesia with techniques and data which can help improve the efficiency of family planning delivery in Indonesia.

This study represents a collaborative effort of BKKBN, the World Bank,

and the Royal Government of the Netherlands, all of whom funded the study.

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This monograph is a tribute to Dr. Henry Pardoko, an honorable and

dedicated Indonesian, who passed away while it was under revision.

## 1. INTRODUCTION

Indonesia has achieved one of the most impressive records in fertility reduction over the past two decades. The country's total fertility rate has declined from an estimated 5.5 in 1967 - 1970 to between 3.3 - 3.7 in 1985 (Hull and Dasvarma 1988; Suyono and Shutt 1988). Population growth has been estimated at 2.1 percent during the eighties (Prescott et al. 1986).

Many observers credit Indonesia's National Family Planning Coordinating Board (known by its acronym, BKKBN) as instrumental in this fertility reduction and slowdown of population growth (Hull et al. 1977; Sinquefield and Sungkono 1979; Chernichovsky and Meesook 1981). Key reasons for the success of BKKBN's program include its community-based distribution system, involvement of local community leaders to promote family planning, administrative decentralization, and an effective reporting, recording, and monitoring system.

About twenty years since its initiation as a national program, BKKBN now faces several challenges. A World Bank study (Prescott et al. 1986) suggests that further declines in population growth to replacement level by the year 2010 can most feasibly be achieved through raising contraceptive use. However, because of past high fertility rates, in order to simply maintain current contraceptive prevalence levels BKKBN must address itself to the problem of reaching growing numbers of young people entering reproductive age. To raise these levels the program furnishes services to populations living in remote areas, educates unmarried youth about the merits of family planning and their future roles as responsible parents, recruits new male acceptors, and creates

appropriate non-monetary incentives for clients to continue use and potential clients to accept use.

Recent budgetary austerities introduced by the Indonesian government are such that BKKBN can reasonably expect slower growth in funding than in the past to meet these growing demands. Donor assistance is expected to decline in the near future. To remain successful, the Government of Indonesia and BKKBN must both use better existing resources and generate new ones.

In 1986, the Government of Indonesia began encouraging partial privatization of the National Family Planning Program. This is not the main reason given for implementing KB Mandiri. This was part of a broader government strategy of shifting the burden of financing and management of public programs to the community. The National Family Planning Coordinating Board has responded to this policy shift by designing the KB Mandiri, or family planning self-sufficiency program, which aims to have those who can afford family planning in the community become self-sufficient through private as well as public outlets.

Beyond these policy shifts, how can the program do better with available resources given its basic philosophy and means of family planning delivery? Productivity and resource mobilization are complex issues in general. They are even more complex in Indonesia, because BKKBN is an agency which largely coordinates labor and capital resources for family planning rather than exercising direct administrative control over them.



The study focuses on the unit cost of family planning delivery as a prime measure of cost-effectiveness. It also focuses correlates of this unit cost. Specifically, in addition to a portrayal of the program, its resources and their distribution and management, the study seeks to answer the following questions:

- a) What is the social cost of family planning delivery?
- b) Who in the government and the community shares in the burden of this cost?
- c) How can the cost-effectiveness of BKKBN's operations be increased through better allocation of the resources it controls?
- d) How can the cost-effectiveness of family planning delivery be increased through an improved strategy that takes into account all resources participating in family planning delivery?

The answer to the first question helps to answer the others by indicating how different inputs contribute to cost. In addition, the answer can contribute to the policy debate about the program by indicating how much the program costs Indonesian society. The answer to the second question is important to understanding the political economy of the Indonesian program: who controls which resources and to what extent? The answer is also crucial to the study of cost recovery issues and how the responsibility of financing the program may be shifted. The importance of the answers to the two remaining questions is clear.

This study was conducted from the end of 1986 through mid-1987. The data were gathered in six kabupaten (regencies) in Indonesia: Tangerang in the province of West Java, Kulon Progo and Bantul in the Special District of

Yogyakarta, and the regencies of Banjar, Barito Kuala, and Tapin in South Kalimantan. While not representative of the entire program, they reflect its diverse nature.

The study is based on the premise that a critical and constructive examination of the program's own experience as to what works better and where - through the association of outputs, resources and cost across operations - could indicate ways to improve the program.

The discussion does not indicate how feasible are any of the suggested changes implied by the cost-effectiveness analysis. This would depend on consumer preferences and on the program's ability to mobilize and reallocate resources, either through the Ministry of Health or the community. Nonetheless, the study's findings should provide useful information for policy-making, planning, and management of the program, and suggest new avenues for program monitoring with a cost-effectiveness perspective.

This monograph consists of eleven chapters. Chapter 2 reviews general Indonesian demographic conditions, the history of the National Family Planning Program, and relevant features of BKKBN's structure, organization and policy. Chapter 3 presents methodology, data sources, and the study areas. Chapter 4 assesses program outputs, levels of prevalence and method mix in the study areas, and compares output data from different sources. Chapters 5 and 6 examine the design and operation of the program by describing capital and labor resources, their organization and activities. Chapter 7 deals with the social cost of the program with attention to structure of cost and funding

sources: BKKBN, MOH, and the community. Chapter 8 examines the structure of delivery cost per user and relative cost-effectiveness of different operations, to determine how this cost might be reduced in the long run. Chapter 9 analyzes worker productivity. Chapter 10 addresses the cost-effectiveness of family planning delivery, taking into account all resources participating in this activity and comparing alternative strategies as manifested by method mix in different study areas. Finally, Chapter 11 summarizes the major findings, explores policy implications, and proposes cost-effectiveness strategies derived from the study.

## 2. POPULATION AND FAMILY PLANNING IN INDONESIA -- AN OVERVIEW

### 2.1. Population Size, Growth, and Distribution

The Republic of Indonesia is an archipelago of over 13,000 islands extending in a 3,200 mile arc from Sumatra in the Northwest to Irian Jaya in the East. The 1985 Intercensal Survey estimated the country to have 164 million people. This ethnically and socially diverse population is the third largest in Asia - far behind China and India, but ahead of Japan, Bangladesh and Pakistan - and the fifth largest in the world. The country is divided into twenty-seven provinces. Total population density is estimated at 85 people per square kilometer, but this figure masks wide regional variations. Sixty percent of the population lives on the island of Java, considered to be among the most densely populated and intensively cultivated areas in the world. In comparison with Java, the Outer Islands are thinly settled. Java, which has only 7 percent of the total land area, has an average of 755 people per square kilometer, compared with 69 in Sumatra, 61 in Sulawesi, 14 in Kalimantan, and only 3 in Irian Jaya.

Indonesia has experienced relatively high rates of population growth over the past two centuries. Population in 1800 was estimated at 3 to 5 million. During the nineteenth century the country grew, on average, between 1-2 percent annually. The population in 1905 was 37 million. Crop failures, epidemics and war dampened population growth rates during the first half of the twentieth century, but these rates have since averaged somewhat over 2 percent per year (Hull et al. 1977). The rate of increase rose from 2.1

percent annually in 1961-1971 to 2.32 percent in 1971-1980, and then declined to 2.15 percent in 1981-85. This rate of increase differs greatly by region, with Java growing 1.30 percent and the Outer Islands 3.76 percent annually in recent years.

The Indonesian population is still overwhelmingly rural. Nearly three-fifths of the work force is engaged in agriculture, much of it either wet rice cultivation in Java-Bali or dry rice cultivation in large areas of the Outer Islands. There is also extensive estate cultivation of rubber, coffee, tea and palm products in various areas of the country.

Over a quarter of the population is now urban. In 1980-85 the urban population grew an average of over 7 percent annually, higher than any other urban population in South East Asia. Rural areas, by contrast, grew at an average annual rate of only slightly more than 1 percent. Population increase was particularly evident in the regencies adjacent to Jakarta—Bogor, Tangerang and Bekasi—which grew at rates considerably above the national urban average. Many medium and large-sized cities in the Outer Islands also experienced high urban growth rates (Ananta and Molyneaux 1987; Rietveld 1988). Rural-urban migration appears to be an increasingly significant component of total urban growth. Some changes may be related, however, to boundary changes.

Indonesia experienced a striking fertility decline over the past several decades (table 2.1). These declines varied by region. "Last live birth" estimates show a 1985 total fertility rate (TFR) of 2.9 in Java, 3.4 in Kalimantan, 3.6 in Sulawesi, and 4.0 in Sumatra (Hull and Dasvarma 1988).

Table 2.1: Estimates of Indonesian Fertility Rates

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<u>Own-Child Method</u>			<u>Last Live Birth Method</u>		
1967-70	1971-75	1980-81	1975/76	1979/80	1984/85
5.5	4.2	3.7	4.9	4.3	.3

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Sources: Lawrence International (1988); Hull and Dasvarma (1988).

Changes in several of the proximate determinants of fertility contributed directly to the reduction. The mean age of marriage of women in Indonesia rose from 19.3 in 1971, to 20 in 1980, to 21.1 in 1985 (Hull 1988). Reasons for this increase include the falling popularity of parentally-arranged marriages, higher female education, improved economic opportunities for young women and growing urbanization.

Increasing use of contraception also represents an important reason for fertility decline. Both socioeconomic factors and program inputs correlate with contraceptive prevalence rates. Various studies have shown that variables such as region (province), women's age, numbers of living children, education, standard-of-living, religion, and child mortality all independently influence contraceptive prevalence levels. Additionally, institutional factors, such as

clinic and family planning program inputs and activities, are influential (Freedman et al 1981; Chernichovsky and Meesook 1981; Lerman et al 1989).

The estimated crude death rate in 1988 was about 10 per thousand (Population Reference Bureau 1988). Mortality has probably fallen most rapidly for young adults, although significant decreases have also been registered for both infants and children (Hull and Hull 1984). Using various direct and indirect estimation techniques, infant mortality rates derived from the 1985 Intercensal Survey clustered around 72 per thousand live births (Streatfield and Larson 1987). Several factors could be responsible for this rapid decline: higher age at marriage, delayed childbearing, longer child spacing, higher parental education and incomes, and greater access to medical facilities and services (Hull and Gubhaju 1984).

## 2.2. The Family Planning Program

The need for family planning was already felt in the late 1950s by local health service providers, particularly those working at the Maternal and Child Health Centers who were attending to high-parity and high-risk pregnant mothers and their children. To limit childbearing, these mothers were introduced to simple methods by a private organization, "The Indonesian Planned Parenthood Association" (PKBI) which was established in 1957 with the support of the International Planned Parenthood Federation. PKBI was the pioneer in the family planning movement in Indonesia, but because the government supported pro-natalist values at that time, its operation was limited to face-to-face contacts. It was not until 1969 that a semi-governmental institute, Lembaga

Keluarga Berencana Nasional, was founded by the New Order Government. The process of implementation, however, was slow. In 1970 the government decided that family planning program management should become the government's responsibility; thus BKKBN was established. Since Java and Bali constituted the most densely populated areas, the six provinces of these two islands were the first-stage target of the family planning program. In its second stage (1974-79), the program was expanded to 10 additional provinces on the islands of Sumatra, Kalimantan, Sulawesi and Nusa Tenggara. In the third stage (1979-84) it was extended to the country's remaining 11 provinces.

### 2.3. Program Objectives and Strategies

The Indonesian family planning program has three basic aims:

- a) the extension of family planning knowledge services to all eligible couples, not only to meet the demand for contraception, but also to bring to public consciousness the need for family planning and small families.
- b) the maintenance of regular, effective contraceptive use.
- c) the institutionalization of the "small, happy, and prosperous family" norm, so that:
  - i) all sections of the population will voluntarily accept the small family as a desirable norm and see large families as socially irresponsible;
  - ii) family planning will become an integral part of all relevant government programs.

To realize these basic aims, BKKBN established several operational goals which could be directly monitored:



- a) to reduce the crude birth rate by half, from 44 per thousand in 1971 to 22 per thousand in 1990;
- b) to attain a maximum of two surviving children for women under 30;
- c) no births to women under age 20;
- d) no births to women over age 30, or to women with three or more children;
- e) postponement of marriage by young couples.

Apart from direct activities aimed at propagating the use of efficient modern contraceptives, the program has also instituted indirect measures to reduce the incentives to have children:

- a) postponing school-leaving age and developing income-generating activities, particularly for young women;
- b) creating employment opportunities for married women;
- c) developing educational activities directed toward increasing family planning and national development awareness among children and young adults between ages 7-24, particularly those living in villages;
- d) improving nutrition surveillance and health services to reduce infant mortality;
- e) developing medical support services, including public education on the characteristics, side effects, and complications of contraceptive methods;
- f) extending social services to reduce the need for children as insurance in old age;
- g) creating cooperative relationships with the Ministry of Health to deliver family planning service through its health facilities, with the Ministry of Information for mass motivation and education, and with the Ministry of Religion to influence religious leaders throughout the country.

BKKBN has made a concerted effort to collaborate with the Ministry of the Interior to ensure the success of the family planning program at various government administrative levels. The Ministry of the Interior maintains the

government administrative levels. The Ministry of the Interior maintains the entire civil administration, from the provinces to the villages. This is part of a wider effort to generate political commitments from all relevant government and private institutions.

During its first stage, the program employed a clinic-based design and was highly dependent on Ministry of Health inputs (Hull and Hull 1986). Family planning outreach services were provided by mobile teams staffed by medical and paramedical personnel. Even at this early stage, the program made use of locally-recruited field workers, primarily women who had direct contact with potential clients and whose duties involved motivation of family planning and education about characteristics, side effects and supply of available methods, and the organization of mobile team visits.

After the implementation of the second five year plan in 1974, BKKEN became more community-based. Under the current system, each village has a village contraceptive distribution center (VCDC). The VCDC is a community-level delivery mode that supplies non-clinical contraceptives, primarily pills and condoms. Its operations are supervised by the family planning field workers. It is often run by the wife of the village head on a voluntary basis. She is typically assisted by members of the Family Welfare Group (PKK), other community volunteers, and acceptor group members (Suyono and Shutt 1988).

Villages have primary health care and family planning volunteers (kader), whose general responsibilities include promoting community participation in

health-related programs and activities; collecting and recording data, providing direct service delivery, and engaging in educational activities. Depending on the specific program, these volunteers may provide a range of services, including monitoring the growth of children under age five, distributing prenatal, immunization, family planning and general nutritional information, encouraging women to space their births and breastfeed their babies, referring patients to health centers, and providing community agricultural services (Judd, 1987). Volunteers may be trained either by the Ministry of Health or by BKKBN.

Many villages, especially those in Java-Bali, have neighborhood acceptor groups, usually with 15-60 members. These are designed to maintain motivation among family planning users and to persuade potential drop-outs to remain in the program. They also provide information to contraceptive users, distribute non-clinical contraception, and report contraceptive use. BKKBN has initiated income-generating activities in many of the more successful family acceptor groups, primarily in Java-Bali. These activities include the provision of relatively cheap loans for capital investments to the group members. BKKBN also encourages cooperative ventures between members. Groups which repay their loans to BKKBN within two years become eligible for unsecured loans from local government banks. Other acceptor group incentives include free hybrid coconut tree seedlings and educational scholarships for children.

Most villages also have Family Welfare Groups (PKK) which meet on a monthly basis. These group meetings are especially designed for village women, and part of their agenda includes family planning and primary health

care issues. PKK groups also engage in income-generating activities. Especially in more remote areas, these groups act as an important means by which to recruit new contraceptive acceptors.

As it developed, the program integrated itself into the village structure, both through its relationship with village n                      d by establishing social organizations which reinforce the use of family planning by village members.

#### 2.4. New Trends

BKKBN recently proposed a greater privatization of the national program. This new strategy is known as KB Mandiri or "family planning self-sufficiency". Elements of this program include greater responsibility for private physicians and midwives in providing contraceptive information and supplies, the social marketing of condoms, and higher community involvement in funding and implementing family planning efforts. As the design for KB Mandiri now stands, those groups and communities which can afford to pay for family planning will be fully self-supporting, those with fewer resources would receive partial government support, and those totally without means would still receive a full government subsidy. KB Mandiri strives to redirect the attitudes and behavior patterns of individual family members, so that they can take the initiative for providing for their own family planning needs.

Another new orientation is the Gerakan Masyarakat Keluarga Berencana or the "community family planning movement." As authorized by the 1988 State Policy Guidelines, BKKBN will develop a program whereby community members -

such as village heads, religious and cultural leaders, youth, and women - promote family planning activities. Its members will functionally resemble the current volunteers, but their responsibility will be confined to family planning.

## 2.5. Summary

The National Family Planning Program operates in a country undergoing widespread demographic and social transformation. Fertility and mortality rates are falling rapidly and urbanization rates are rising. These trends are particularly pronounced in the heavily populated area of Java-Bali. These phenomena both influence and are influenced by concurrent rapid social, economic, technological, and organizational changes affecting the country.

Functioning in this type of environment means that BKKBN administrators must be acutely responsive to changing conditions. Improvements in education and urban-bound migration, for example, could increase consumer demand for more effective contraceptive methods, which in turn would entail new family planning strategies. In this regard one should underscore that BKKBN is a coordinating agency. While it has its own resources, it mobilizes and uses resources of other government agencies and the community for family planning purposes. How BKKBN operates under these conditions and what its latitude is in changing strategies are the subjects of the following chapters.

### 3. THE STUDY

#### 3.1. Introduction

Indonesia is a vast and varied country. The family planning program shares those basic characteristics, as it is imbedded in the country's social, political, and administrative systems. The study takes advantage of some of this variety for a comparative analysis. This chapter introduces the study: the basic political and institutional framework in which it takes place; the conceptual framework guiding data collection analysis; the study areas; and the nature of the data collected.

#### 3.2. Political Economy of Family Planning Delivery

Many resources devoted to family planning actually belong to the Ministries of Health, Interior, Religion, and Information. These ministries provide inputs to the family planning effort throughout the entire hierarchical civil administrative structure, from the hamlets (dukuh) and villages (desa) up through the subdistricts (kecamatan), the regencies/municipalities (kabupaten/kotamadya) and provinces (propinsi).

BKKBN is the coordinating agency. It operates under several constraints in conjunction with which the efficiency of its operations must be assessed. These constraints include national administrative regulations, availability of medical and community resources or infrastructure, BKKBN's budget, and client preferences. As data about client knowledge, preferences, and behavior were

not collected in this study, only the first three are discussed. A major concern in the study is to establish the degree to which these constraints affect BKKB's planning, operational latitude and cost-effectiveness of operations.

The administrative constraint relates to BKKB's operation within the boundaries of the Indonesian public administration system. Regardless of geographic size, population, or other features which might influence resource productivity, BKKB has only one family planning supervisor per subdistrict, and its resources are managed within such boundaries.

Given horizontal planning processes between various government agencies, BKKB can provide advice about the supply, distribution, and administration of health facilities and personnel, but has little control over them. In the community, BKKB field workers oversee village family planning volunteer activities; however, unlike the field workers and their supervisors, volunteers are not members of the Indonesian civil service and do not receive salaries or other direct benefits. The volunteers are closely associated with the local village civil administrators and leaders and thus are not entirely answerable to BKKB.

BKKB operates within its own budget, which covers mainly the cost of labor - field workers and supervisors - and supplies. It can also promote family planning through community and individual incentives. BKKB's major decisions concern the size of the field worker's operations, staff qualities, personnel management, and the allocation of funds to supplies and income-

generating schemes. In addition, BKKBN has marginal resources to compensate for deficient community infrastructure and resources, mainly health personnel. BKKBN can allocate its budget in view of administrative and community constraints. The delivery strategy - that is, to what degree it is clinically or community-based - is determined primarily by the availability of health and community resources.

Consequently, an assessment of how the program can do better requires that the national program be viewed from different perspectives:

- a) the allocation of resources directly under the control of BKKBN;
- b) the allocation of government resources coordinated by, but not under the direct control of, BKKBN; and,
- c) the efficient allocation of all social resources, including those provided by the community.<sup>1</sup>

### 3.3. Analytic Framework

Cost-effectiveness calls for delivery of maximum protection subject to resource and other constraints. This means realizing maximum demographic impact through the program at minimal unit cost per unit of protection.<sup>2</sup>

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<sup>1</sup> Since the public program currently handles about 90 percent of the total national effort, only this program is studied.

<sup>2</sup> Because of a lack of suitable data about the population, including its income distribution and family planning preferences, program efficiency will consider primarily budget constraints. Equity issues are not considered explicitly.



A program or operation can be identified at any particular time by two types of inputs: those which change with output level - variable inputs - and those which do not - fixed inputs. In a clinic, the building size and amount of equipment are unlikely to change with the number of visitors. Supplies of contraceptives and other disposables certainly change, probably in proportion to number of visitors. In an outreach operation with a single field worker promoting, coordinating, and delivering contraceptives, the worker may be considered the fixed input, if employed full-time. His or her time input may change in relation to output levels.

Parallel to inputs, cost is also divided between fixed and variable. Dividing total cost by number of family planning users yields the unit user cost. The greater the number of users serviced by an operation, the lower the fixed cost component in the unit user cost of that operation. Consequently, the potential for economies is higher in operations where the fixed cost component is high in relation to the variable cost component. And as supplies are proportional to output levels, a rise in the unit cost of the operation generally follows a decline in marginal productivity of labor, leading to an increase in marginal cost of output that is not offset by a fall in fixed cost per unit. This is to say, the rise in output levels is less than proportional to the leading rise in amount and cost of labor. This may reflect, on the one hand, constraints of fixed inputs - including management, and on the other hand (especially in the field of family planning), increasing efforts required to mobilize additional users.

In conjunction with another similar operation, an operation would be

considered relatively inefficient in two extreme situations. First, when it operates at too small a scale; expansion of output through the other operation would still reduce overall unit cost. Second, when it operates at too large a scale; introducing a new operation, e.g. a new clinic, would reduce such unit cost. In the second case, this may require new (long-term) investments and reorganization. Identification of cost, especially in relation to labor productivity is therefore critical elements to a cost-effectiveness analysis of family planning services. It helps identify efficient patterns to allocate resources, or delivery strategies.

In an environment where various institutions control different resources and pay for them, individual institutions may find it hard to recognize an overall or social cost-effective strategy, because the different institutions respond to different aspects of cost and productivity, and therefore overall social efficiency in delivery may be hard to attain. BKKBN need not, for example, consider in full the cost borne by the Ministry of Health (MOH). The government, including MOH, BKKBN, and other ministries may not respond to the cost shouldered by the community. All institutions combined may be insensitive to cost of inputs provided by international donors. From a policy perspective, it is therefore crucial, in addition to evaluating unit cost, to assess the extent of funding control various institutions have on different resources participating in the family planning effort, especially when those institutions have different objectives competing for the same resource.

Given the institutional framework discussed above, three sets of resource

constraints are considered: BKKBN's, the Government's, and the society's. As is shown later in the discussion (chapter 7), the marginal cost of family planning delivery in Indonesia is borne mainly by BKKBN and the community, while the fixed cost is borne by the Ministry of Health (MOH).

Cost-effectiveness can be seen as having two conceptual aspects: allocative efficiency and internal efficiency. Allocative efficiency issues involve the question of how additional resources should be allocated across operations and, within each operation, among the different services or methods offered. The allocation question in the case of Indonesia stems primarily from the different levels of infrastructure that can benefit BKKBN's operations in the different provinces. Internal efficiency issues here concern the allocation of resources in any given operation or service. These issues concern the question of what resources or productive attributes should be expanded at the margin, possibly at the expense of others, in order to increase the cost-effectiveness of an operation.

This segregation of efficiency questions guides the study. Each of the distinct study areas is first examined separately as an individual program, then compared with others. In this manner, we study ways in which BKKBN and the Indonesian government might improve overall efficiency by promoting particular operations and types of programs.<sup>3</sup>

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<sup>3</sup> Any implied programmatic changes are assumed to be marginal within the realms of current contraceptive technology, consumer preferences, and BKKBN's current structure and patterns of delivery. The analyses stemming from the two efficiency questions may suggest promotion, at the margin, of one family planning method at the expense of another, and the serving of different populations. It must be borne in mind, however, that no data are available on demand for alternative methods. Suggestions about a "preferred" method (cum

The quest for cost-effectiveness calls for improved design in terms of targeting program resources, choice of delivery modes, method mix, and personnel traits. The task is even more complicated for BKKEN, as it must also allocate some of its resources to resource mobilization from other institutions and the community, and then make the best use of all resources within its domain.<sup>4</sup> In this discussion, we focus on the allocation of resources to delivery given resource availability for that purpose. While the optimum may never be achieved, marginal changes and fine-tuning of program design and operations according to some basic economic principles can lead in the right direction.

To establish the cost levels of family planning delivery - the first necessary step for a cost-effectiveness analysis - the study examines:

- a) Levels and nature of resources for family planning efforts coordinated by BKKEN;
- b) Ownership or funding sources of these resources;
- c) Allocation of these resources and its determinants, and
- d) Cost of resources.

A demand and supply framework, outlined here in general terms, is employed

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mode of delivery) and program from a cost-effectiveness perspective, must ultimately consider consumer preferences. A program may be cost-effective in terms of unit costs of protection offered, but socially inefficient when consumer preferences are not considered.

<sup>4</sup> That is, part of BKKEN's budget must be allocated to resource mobilization. The optimal program indicating how a non-profit organization should allocate its initial budget between resource mobilization or recovery and delivery in order to maximize delivery is under development (Chernichovsky 1990).

to determine labor productivity and efficiency of operations. Accordingly, demand (QD) for contraceptives in a given operation is depicted by:

$$QD = d (\text{population size, population characteristics, promotion activities, the "full price" [FP] of service to clients})$$

That is, the quantity of fertility control demanded in a given catchment area is a function of:

- a) population size, which influences potential demand for contraception and scale of operations;
- b) population characteristics, which determine the demand for children, fecundity, and attitudes toward family planning (Easterlin and Crimmins 1983), all of which determine demand for contraception;
- c) promotion activities such as Information, Education, and Communication (IEC) activities and incentives to households; and
- d) the full price of service to the client, which is determined by fees (when applicable) and ease of access to outlets and support services.<sup>5</sup>

Effective demand levels vis-a-vis potential size of operation are important to cost-effectiveness because scale economies, as suggested above, are a major means of reducing user cost or increasing cost-effectiveness. Therefore, consumer demand is a major concern to program planners and managers; in addition to identifying the size and nature of a catchment area, they may need to

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<sup>5</sup> "Access" can relate to many aspects of the client's perceptions of cost and comfort of service. Therefore, the nature of inputs, e.g. female vs. male workers, might be considered in order to assess their impact on the full cost of contraception to the consumer, especially in the absence of fees for service. See Chernichovsky and McLaughlin (1988).

influence client behavior. Program managers have two options: promotion, largely through IEC activity, and manipulation of the full price of service. Both require resources and therefore present managers with the challenge of an optimal allocation between the options.

The supply of contraceptives in the community concerns a program's capability to influence and accommodate potential clients by affecting the full price of contraception or the client's perceived access to service. This price can be lowered when the program has more and better resources for delivery. Generally, for a given external program budget<sup>6</sup>, the following relationship obtains:

$$\begin{aligned} \text{"Full price" to the client (FP) =} \\ s \text{ (QD, money resources or budgets allocated to delivery, input} \\ \text{prices, infrastructure)} \end{aligned} \quad (3.2)$$

That is, the price is a function of:

- a) quantity demanded (QD), which determines the actual scale of an operation. When it is "too high" for a particular operation in the short run, it may involve a high price to potential consumers and a lower the program's ability to accommodate all of them;<sup>7</sup>
- b) money resources allocated to delivery, which determine how well consumers can be accommodated, when input prices are given;

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<sup>6</sup> The term "external" program budget concerns those resources available to the program at its outset, before resource mobilization in the community.

<sup>7</sup> Under-demand will not affect the consumer price. A fuller discussion of this issue follows in chapter 8.

- c) input prices, which determine the level of real resources available for delivery. The higher the prices the lower the real resources;
- d) (community and other) infrastructure, which enhances a program's potential by augmenting productivity of other resources;

A third relationship concerns mobilization of community resources, which are included under infrastructure:

$$I = i \text{ (program inputs for resource mobilization,} \\ \text{community infrastructure)} \quad (3.3)$$

This quantity is determined by:

- a) the inputs the program allocates to mobilize resources. The higher the input levels, the higher the level of resources mobilized;
- b) the infrastructure, health and other community facilities, which determine the potential for resource mobilization.

The discussion thus concerns allocation of resources between promotion, delivery, and community resource mobilization, so that delivery unit cost is minimized. When all costs and institutions participating in delivery are considered, the third relationship can be integrated in relationship 3.2.<sup>8</sup>

The nature of the institutional constraints discussed above is such that from the delivery perspective, method mix may be greatly influenced by

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<sup>8</sup> This may be also warranted for subsequent statistical analysis because it may be impossible to separate the impact of the contribution of the community to infrastructure from the impact of its characteristics on demand.

availability of MOH infrastructure and personnel.<sup>9</sup> This also means that fixed costs are largely borne by MOH, and that BKKBN may have little latitude in controlling method mix and hence the variable cost of supplies. BKKBN controls only its labor cost. A basic working hypothesis here is that BKKBN may indeed have a relatively limited scope in the determination of cost-effectiveness. Through allocative decisions, it can affect the internal efficiency of its operations only by enhancing the productivity of its labor.

In sum, labor productivity is thus envisioned as resulting from an interaction between demand and supply factors that characterize a particular operation. Labor is believed to be the major instruments by which P<sup>1</sup> N may influence the cost-effectiveness of family planning delivery.

The study areas and data have been selected with a view towards identifying the resources participating in family planning delivery, their cost, and what might affect unit cost through alternative delivery strategies.

#### 3.4. Study Areas

The Indonesian Family Planning Program covers all 301 regencies and municipalities in the country's twenty-seven provinces. Six regencies were selected in three provinces as study sites:

- a) Tangerang in the Province of West Java;

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<sup>9</sup> This affects not only potential supply patterns but also consumer demand.



- b) Kulon Progo and Bantul in the Special District of Yogyakarta; and
- c) Banjar, Barito Kuala, and Tapin in the Province of South Kalimantan.

Figure 3.1 shows the study provinces in relation to the entire country. The study covers family planning operations in 83 subdistricts and 1016 villages, where 406 field workers and 83 supervisors operate (figure 3.2). Villages in Java are divided into hamlets, with an average of three hamlets per village.

These areas do not constitute a representative sample. Indonesian provinces vary greatly in terrain, population size, ethnicity, and religion. Short of conducting a large-scale national survey, the country's heterogeneity precludes representativeness. The areas were selected, however, so that the populations and conditions are fairly homogeneous internally, yet with distinct variations between them. The study areas do reflect part of the wide spectrum of socioeconomic environments and programmatic conditions which shape family planning operations through both the nature of the population and the availability of infrastructure.

Figure 3.1: Location of Study Areas

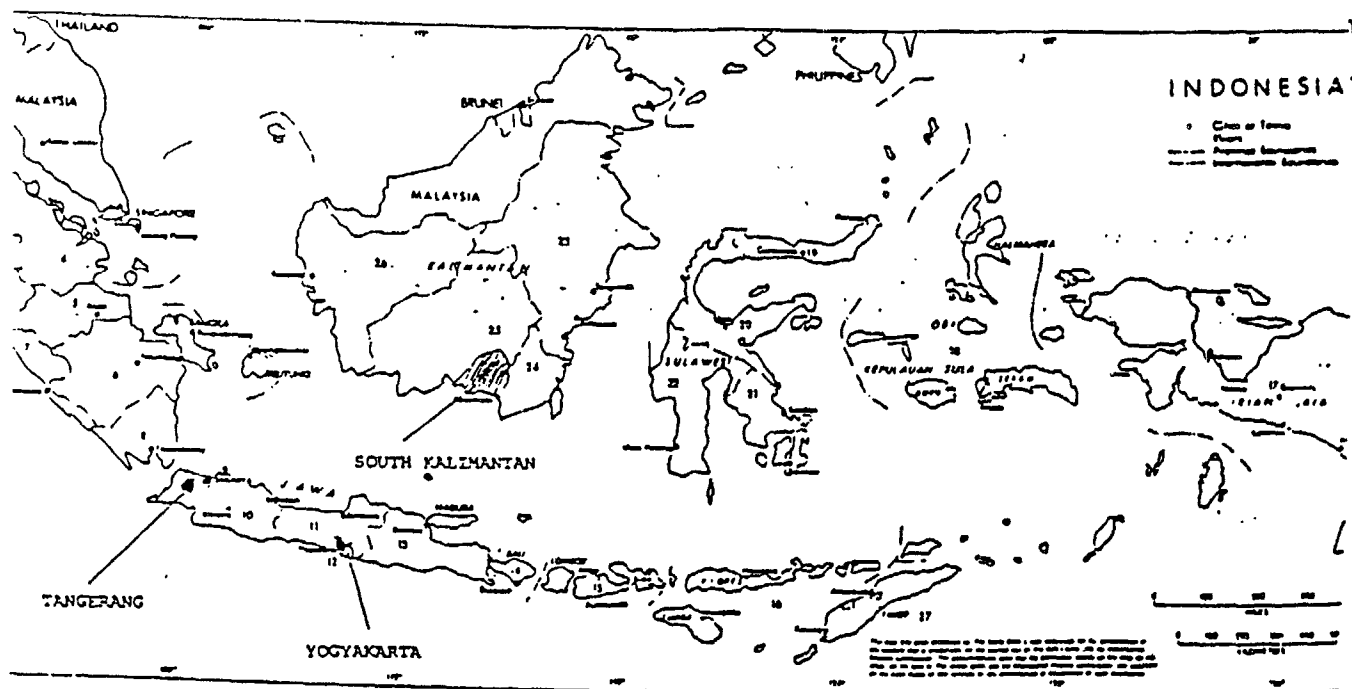
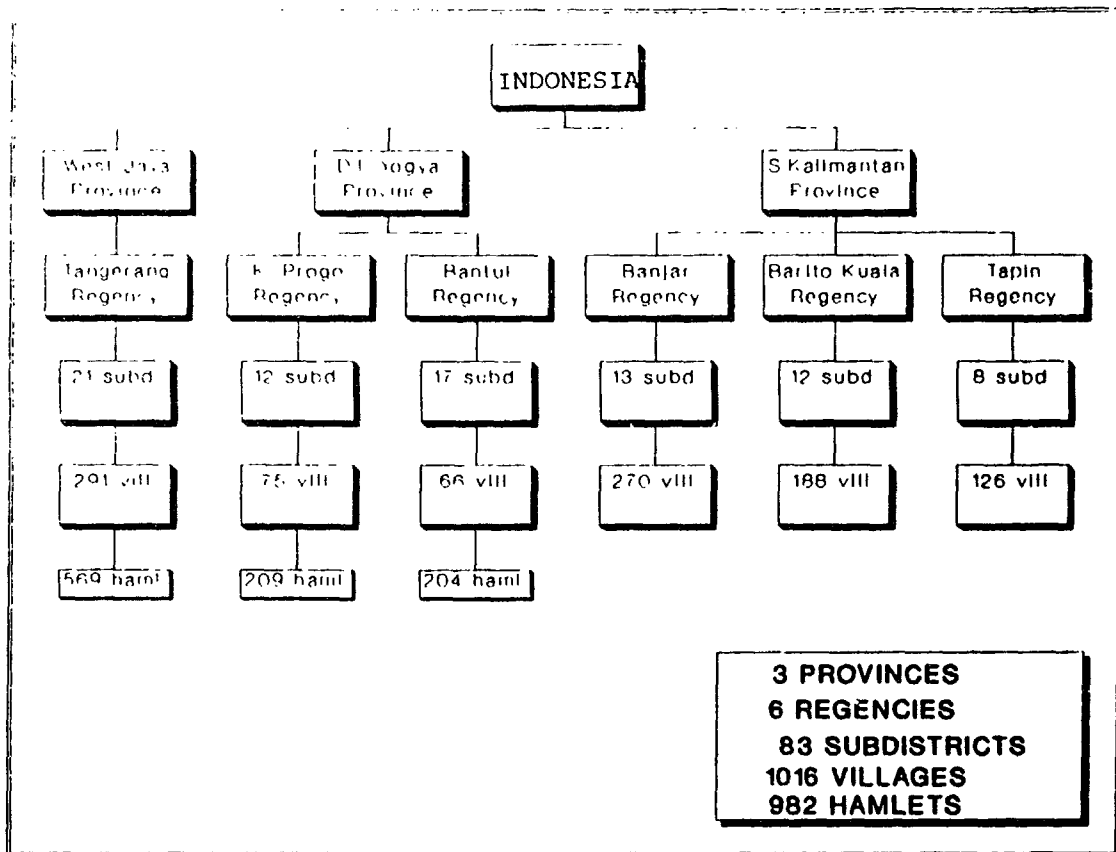


Figure 3.2: Study Areas <sup>10</sup>



<sup>10</sup> Tangerang consists of 28 subdistricts. Three subdistricts have been eliminated from the study because of inconsistencies in the data. Personal data on workers were analyzed however. Four subdistricts were combined due to an administrative reorganization. South Kalimantan does not have hamlet-type communities. The hamlets are those participating in the study, not all the hamlets in the region.

Table 3.1: Land and Population Sizes

	Kulon		Bartito		Bartito		Bartito	
	Tangerang	Pago	Bartito	Bartito	Kuala	Tagin		
Population (a) (in thousands)	1,783.1	372.6	633.1	359.6	172.4	103.0		
Land Area (b) (km <sup>2</sup> )	1,044.0	586.3	506.9	6228.3	3284.0	2315.0		
Density (population per km <sup>2</sup> )	1,708	636	1248	57	52	44		

1 Source: EKKV Annual Report (1986):

2 Source: Hasil Registrasi Penduduk Akhir Tahun (1986).

This section examines demographic and socioeconomic variations between the six study regencies. This description is not meant to be a thorough exploration of socioeconomic and demographic conditions among the study regencies. The objective of this overview of provincial diversity is to show that the program operates under very different social, economic, and demographic conditions, and that cost-effectiveness considerations must take regional variations into account.

The regency study sites differ widely by population size and density. There are considerable geographic and demographic differences among the study areas (table 3.1). The land area of the two Yogyakarta regencies is similar, but population size is different. The three South Kalimantan kabupaten have roughly equal population densities, although Banjar has both a larger population and land area than either Barito Kuala or Tapin. Population density is highest in Tangerang (neighboring Jakarta) and lowest in South Kalimantan. Tangerang and Bantul are approximately twenty-five times, and Kulon Progo thirteen times more densely populated than the three South Kalimantan regencies. These density differences are a common feature of the Indonesian environment, and have an impact on family planning program operations.

Sex ratios appear to provide indirect evidence about migration patterns. Migration research in Indonesia indicates that those most likely to move are males and those in their late teens and early twenties (Suharso et al. 1976; Hugo 1979); this sex and age selection particularly appears to characterize urbanward migration. Tangerang, which has the most heavily male sex ratio (table 3.2), is contiguous to West Jakarta. This may reflect population

movement towards the urban fringe.

Government-supplied contraception is legally furnished only to married couples. These married couples are the potential clients for BKKBN and are called "eligible couples" (ELCOs). There is a comparatively high number of ELCOs in Tangerang and South Kalimantan (table 3.2).

Table 3.2: Demographic Features

	<u>W. Java</u> Tangerang	<u>D.I. Yogya</u> Kulon Progo	<u>Bantul</u>	<u>S. Kalim.</u> Banjar	<u>Barito</u>	<u>Tapin</u>
Population (in thousands)	1,783.1	372.6	633.1	359.6	172.4	103.0
Sex ratio M/F	104.5	94.2	95.3	98.0	101.2	98.8
Eligible couples	16.0%	12.0%	12.9%	15.7%	15.9%	16.2%
Children under age five	14.5%	7.0%	9.0%	10.6%	11.2%	10.7%

Source: BKKBN Annual Report (1986).

The number of children under age five is negatively correlated with the acceptance of family planning in the near past, and might indicate a need for family planning services in the near future. In Tangerang, children under five constitute over 14 percent of the population, more than double the proportion in Kulon Progo. This not only reflects the higher number of ELCOs, but also the lower acceptance of family planning in Tangerang (see Chapter 4).

The study areas differ widely in their proportions of urban-dwelling populations (table 3.3). Tangerang's urban proportion is surprisingly low given its proximity to Jakarta. Tangerang most certainly is an area of "suburban" movement from Jakarta. The evidence for this is indirect (demographic composition and transportation flow, for example) but persuasive (Hugo 1978). Many of these migrants probably live in housing complexes (perumahan) or small communities which would not be classified as urban. It is nevertheless clear that most all these people would have urban services available to them in Jakarta, if only because many work in the city. Other areas are semi-urban (Bantul, the kabupaten adjacent to Yogyakarta Municipality) or wholly rural (Barito Kuala and Tapin).

Table 3.3: Urban Residence

	W. Java Tangerang	D.I. Yogya Kulon Progo	Bantul	S. Kalim. Banjar	Barito	Tapin
Urban Population	14.9	4.8	10.2	13.8	0.0	0.0

Source: Sensus Penduduk (1980).

Indonesia is largely a Moslem country. The average West Java regency is almost exclusively Moslem and Tangerang regency only slightly less so. The non-Moslem population in Tangerang is largely Buddhist, and one can reasonably surmise, Chinese. West Jakarta has a large Buddhist (and Chinese) population, and this is perhaps part of the reservoir from which Tangerang draws. (The percentage of Hindu throughout the study and comparison areas is negligible.)

There are relatively high Catholic and Protestant populations in West Jakarta and the Special District of Yogyakarta, especially in the city of Yogyakarta. A portion of these people would be Chinese, although since the Yogyakarta area of Java is considered a prime Catholic center in Indonesia, many Catholic adherents would also be Javanese. South Kalimantan is overwhelmingly Islamic.

Education levels are relatively high in DI Yogyakarta regencies, where school attendance for children 7-12 is higher than in West Jakarta. There are also higher proportions with high school or higher education than in either West Java or South Kalimantan. The existence of a well-developed educational infrastructure (in 1980) in DI Yogyakarta helps explain this phenomenon. Tangerang presents an interesting alternative case. In 1980, Tangerang had the highest illiteracy rate of all the study areas; at the same time, there is a sizeable percentage with a high school education. The most compelling interpretation of these data is that Tangerang exhibits an educational profile characteristic of many high in-migration areas. Immigrants often come from the most privileged and least privileged classes, which have the greatest motivation to move.

In South Kalimantan, the Banjar regency has the best-educated population. Relatively low school attendance rates by children aged 7-12 indicate the relatively inferior schooling infrastructure in the outer islands in the late seventies.

In summary, this outline of regional conditions indicates considerable differences between the areas in terms of population densities, urban residence,



religion and education, all affecting the demand for contraception, in addition to service availability. Because of these conditions and differences in pertinent government and community infrastructure, the National Family Planning Program lacks uniformity, with some provinces having already achieved high performance and others not. The study exploits this variability for a comparative examination within and across study areas.

### 3.5. Data

There are three categories of study data: community data, personnel data, and data on health care and family planning facilities. These data concern the nature of the program's target population, resources employed in family planning delivery, resource allocation, patterns or organization and output. Data were collected at the hamlet (dukuh), village (desa), and subdistrict (kecamatan) levels.

Community data were acquired from each subdistrict and village. In Java, villages comprise several hamlets; thus for this area, facilities and personnel information was gathered on roughly three hamlets per village. The PPLKB or field workers' supervisor provided the subdistrict data, and the PLKB, the field worker, the village and hamlet data. They filled out two questionnaires, one describing the community in general terms, including population characteristics and availability of health care/family planning facilities and the second describing the family planning program, including data on new and current acceptors, and time spent on IEC, (Information, Education and Communication) organizational meetings, etc.

Data were also obtained from subdistrict health centers (PUKESMAS), health sub-centers, mother and child care clinics, community-integrated health posts (POSYANDU), village contraception distribution centers (VCDC), and sub-village contraceptive distribution centers (sub-VCDC). These facilities provided three reports about: 1) general characteristics, size, staff, and inventory; 2) utility payments and family planning distribution; and 3) drug distribution.

Information was furnished about the following types of personnel, by personal confidential questionnaires: 1) family planning field worker supervisors (PPLKB), 2) family planning field workers (PLKB), 3) medical doctors, 4) other medical staff (nurses, midwives, auxiliary midwives, and paramedics), 5) other health center staff, 6) volunteers (PPKED), and 7) village and hamlet heads. Each provided personal information and data about wages, other income, and his or her household expenses. In addition, all family planning workers and medical staff reported time spent on different activities.

Two BKKBN secondary data sources were used as well. These included the Yearly Report (Pendataan), and the Contraceptive Services Recording and Reporting System. The Pendataan provides subdistrict information about population, eligible couples, current users, new acceptors, and method mix. It is prepared once a year by PPLKB and PLKB and is based on a house-to-house census PLKBs take in their jurisdictions. October 1985 and October 1986 data were used in this study.

The BKKEN Contraceptive Services Reporting and Recording System provides regional reports at subdistrict level that were also used, particularly regional ones which recapitulate Family Planning Clinic Monthly Reports. These reports document service activities, distribution of contraceptive supplies, and a registry of user and new acceptors served by all family planning clinics, mobile medical teams, and other family planning outlets in the clinic operational area (private physicians and nurse-midwives, pharmacies, and VCDC). November 1986 data were used here.

### 3.7. Summary

Unit cost of delivery is regarded in this study as a measure of cost-effectiveness of family planning operations. In any given program or operation at a particular time, this cost is influenced by cost of fixed capital and overhead inputs, quasi-fixed labor inputs, and contraceptive supplies. A priori, unit cost falls with scale of delivery up to a particular level of output, since fixed costs are distributed over a larger number of users and costs of supplies are generally constant per user. It falls, however, for as long as marginal labor productivity does not diminish and marginal cost of output does not increase fast enough to offset the falling fixed cost per user.

A supply and demand framework guides the study in terms of data gathering and analyses. As BKKEN is a coordinating agency, it does not control all resources participating in family planning delivery, such as medical infrastructure and personnel that, together with consumer demand, influence

the method mix available and used in any particular area. Consequently, at a programmatic level, BKKBN may have limited control over fixed capital costs and variable supply costs, or over program strategy as means to increase program efficiency. BKKBN can essentially control only the cost-effectiveness of operations through its labor inputs. These are the central hypotheses underlying the study.

#### 4. PROGRAM OUTPUT

##### 4.1. Introduction

Measurement of program performance, effort, or output during a specified time period is a key to the discussion. The "stock" of users served by the program and the "flow" or change in this stock are two common measures. These, in turn, can be expressed in terms of Couple Years of Protection (CYP) delivered that approximate potential demographic impact. The stock and flow measures indicate a program's success in retaining users and mobilizing new acceptors. In this chapter we present details of program output levels measured by number of users and by type of contraceptive used in the six study areas, reflecting the variability of the Indonesian program. In the chapters that follow, the differences and variations in output levels and method mix across regions are related to variation in resources and their costs, thus enabling a study of program effectiveness. Given the significance of program output in the discussion, we start by comparing alternative data sources for this variable.

##### 4.2. Program Output Data

The data used to measure output or performance in this study are derived from four sources:

- a) monthly reports on contraceptive use collected as part of this study from field supervisors (PPLKB) for each

subdistrict participating in the study.

- b) monthly reports on contraceptives use collected as part of this study by field workers (PLKB) for each village and hamlet participating in the study;
- c) BKKBN monthly clinic service statistics; and,
- d) BKKBN's Pendataan or Annual Field Worker Report.

The first two were collected during the course of the field work, and the second two were taken from BKKBN Reporting and Recording System documents.

The third source, monthly clinic service statistics, is taken from reports BKKBN receives on a monthly basis from subdistrict-level clinics which document inter alia the distribution of contraceptive supplies and the recruitment of new acceptors. These data not only cover the clinics themselves, but also mobile medical teams, private physicians and nurse-midwives, pharmacies, and VCDs operating in the subdistrict. This information can then be used to calculate numbers of contraceptive users by applying assumptions about method-specific distribution or continuation rates (Streatfield 1984, Streatfield 1985). Contraceptive prevalence rates can be determined by dividing the number of contraceptive users by numbers of eligible couples. November 1986 data were used.

The fourth source, the BKKBN Annual Field Worker Report, or Pendataan, provides subdistrict information about population, eligible couples, the number of children under five years of age, current users, new acceptors, and method mix. Every October, PPLKB and PLKB gather data based on a house-to-house census which PLKB takes under its jurisdiction. BKKBN undertakes this

effort in order to update its routine service statistics and to enhance local and national planning exercises. October 1985 and October 1986 data were used.

Studying the relationship between the different data sources leads to the conclusion that they are almost "identical" for analysis of variance. This is shown through the means and first order correlation coefficients in table 4.1. While, not surprising, BKKBN's monthly clinical report, based on supplies, shows the highest means, and the study survey data provided by the PPLKB and the PLKB show the lowest, the correlations between all sources is very high.

#### 4.3. Program Statistics and Survey Data

Even though the four data sources used in this study are internally consistent, all are reported through the BKKBN subdistrict office. A question thus arises as to the validity of these data from all four sources. External validation may be obtained from the 1985 Intercensal Survey (SUPAS) and the 1987 Demographic and Health Survey (DHS).

Table 4.1: Mean Number of Users Per Subdistrict and First Order Correlation Coefficients Between Different Sources of Program Output, by Source of Data

	Annual report	Clinic distribution report	Supervisor report	Field worker report
Mean no. of users	3,922	4,377	3,876	3,383
No. of subdistricts	83	83	80	80
—Correlation Coefficients—				
Annual report	1.000000	0.972021	0.892047	0.964498
Clinic distribution report	0.972021	1.000000	0.904451	0.940234
Supervisor report	0.892047	0.904451	1.000000	0.893247
Field worker report	0.964498	0.940234	0.893247	1.000000

The difficulty in using the survey data, however, is that only provincial-level information was published. We use these data, nonetheless, on the assumption that any differences that exist between provincial-level survey data and service statistics exist at the regency and sub-regency levels, as well. This assumption is based on the fact that BKKBN's Annual Report is an aggregate of local reports, as implied in table 4.1.

Contraceptive prevalence rates from the service statistics are higher than those from the surveys (table 4.2). It is noteworthy that DHS data are somewhat closer to the BKKBN statistics than SUPAS. The service statistics



rates for pills, condoms, and injectables are derived from supply distribution, and for the first two at least, are clearly subject to inflation from supply wastage. A higher service statistics CPR can also occur because of high continuation rates BKKBN applies to IUD use (Streatfield 1985). Intercensal survey rates may be low because of conservative definitions applied to pill and condom use.<sup>11</sup>

The contraceptive method mix rates among all data sources generally show that pills and condoms account for a higher proportion of contraceptive use in the service statistics than in the intercensal survey. This is particularly true for pill use in West Java and condom use in DI Yogyakarta. "Other method" use is higher in the intercensal survey than the service statistics because of the inclusion of traditional methods.<sup>12</sup>

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<sup>11</sup> It is beyond the scope of this discussion to compare the various data sources in a methodological manner.

<sup>12</sup> The Central Bureau of Statistics recorded a woman as a pill user only if she had taken the pill within two days before the intercensal survey interview, and a condom user if a condom had been used during last intercourse.

Table 4.2: Comparison of Contraceptive Prevalence and Method Mix Rates for the Three Provincial Study Areas Using 1985 BKKEN Monthly Service Statistics, the 1985 Annual Report (Pendataan), the 1985 Intercensal Survey, and the 1987 Demographic and Health Survey

	Method Mix Rates						
	Current Prevalent Rate	% Pill	% IUD	% Condom	% Inject.	% Other <sup>a</sup>	Total
<u>West Java</u>							
Annual Report	58.0	46.8	20.7	0.2	30.2	2.1	100.0
Intercensal Survey	44.5	38.5	26.0	0.5	30.4	4.6	100.0
Demographic and Health Survey	43.8	41.6	20.3	1.8	30.7	9.0	100.0
<u>Tangerang</u>							
Monthly Service Statistics	57.6	33.1	8.3	0.1	56.2	1.9	100.0
<u>DI Yogyakarta</u>							
Annual Report	73.9	21.1	41.7	17.2	7.3	12.7	100.0
Intercensal Survey	54.9	17.3	52.7	5.3	11.9	12.8	100.0
Demographic and Health Survey	68.0	10.2	45.9	6.1	11.4	26.3	100.0
<u>Kulon Progo</u>							
Monthly Service Statistics	73.4	15.2	45.9	32.7	1.7	4.5	100.0
<u>Bantul</u>							
Monthly Service Statistics	63.8	35.5	32.1	26.7	2.9	2.8	100.0
<u>South Kalimantan</u>							
Annual Report	54.7	84.8	6.4	1.4	6.3	1.1	100.0
Intercensal Survey	33.7	82.0	4.7	0.3	7.5	5.5	100.0
Demographic and Health Survey	N/A	N/A	N/A	N/A	N/A	N/A	—
<u>Banjar</u>							
Monthly Service Statistics	43.6	85.6	5.7	1.3	6.8	0.6	100.0
<u>Barito Kuala</u>							
Monthly Service Statistics	53.9	87.6	3.7	1.3	4.9	2.5	100.0
<u>Tapin</u>							
Monthly Service Statistics	50.3	90.6	3.5	1.5	4.3	0.1	100.0

<sup>a</sup> The BKKEN services statistics "other" category includes male sterilization, female sterilization, and vaginal spermicide. The Intercensal Survey "other category" includes jamu (herbal medicine), retroflexion of the uterus, and abstinence.

The key question is whether or not these differences render the BKKBN data used in this study invalid. This would be the case if the discrepancies varied unsystematically across units of observation within any given province. Under these circumstances, pill and supply wastage, for example, would be greater for some units than for others within a province. There is no evidence in the data suggesting this kind of variation; the contraceptive mixes are highly consistent according to all data sources. It is the prevalence rates that differ. This leads to an assumption that all discrepancies are systematic and have a "scale" effect. Adjustments for this effect will be made in the discussions which follow.

It is clear from the data that the study areas are not entirely representative of their respective provinces (table 4.1), although method mix is fairly consistent.

In the following chapters we use the Pendataan Annual Report and the supervisors' and field workers' reports as the basis for cost-effectiveness analysis. These data are discussed here.<sup>13</sup>

#### 4.4. Levels of Contraceptive Use

User rates are highest in DI Yogyakarta regencies, and Tangerang and

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<sup>13</sup> This approach reflects part of the philosophy underlying the discussion on using available program information whenever the data collected from the study differ.

the South Kalimantan regencies are approximately at the same lower level (table 4.3). However, in Tangerang the actual pregnancy rate is higher than in South Kalimantan. Particularly in Banjar and Barito Kuala, non-acceptors tend to be neither pregnant nor actually seeking pregnancy. It would seem then, that the lower acceptor level in Tangerang reflects a more conscious decision not to contracept. In South Kalimantan, where the program is youngest and the population sparse, there may be less awareness of the program and access to it is more difficult.

Table 4.3: Eligible Couples, Their Status and Distribution of Family Planning Methods, by Method

	W. Java Tangerang	D I Yogya Kulon Progo Bantul		S. Kalim. Banjar Barito Tapin		
Eligible couples.....	284,747	44,846	81,767	56,605	27,486	16,642
ELOCs current status						
Pregnant women.....	6.9%	2.7%	3.4%	4.6%	5.7%	4.3%
Want more children...	10.8%	5.7%	5.5%	11.2%	9.6%	9.6%
Other non-acceptors..	23.1%	8.7%	15.8%	28.5%	25.8%	21.3%
Current users	59.1%	82.9%	75.3%	55.7%	58.8%	64.8%
Total	100.0%					
Current Users by Method						
IUD.....	12.33%	69.65%	50.06%	5.87%	6.31%	4.70%
Pill.....	23.59%	8.52%	22.64%	81.33%	85.94%	88.80%
Condom.....	1.01%	10.82%	10.84%	1.27%	0.82%	0.47%
Vag. tablet...	0.04%	0.00%	0.02%	0.00%	0.00%	0.00%
Male steril..	0.61%	1.72%	1.18%	0.04%	0.17%	0.01%
Female steril	2.53%	4.71%	6.10%	1.37%	0.43%	0.23%
Injectables..	59.63%	4.58%	9.00%	10.11%	6.33%	5.78%
Implant.....	0.27%	0.00%	0.17%	0.00%	0.00%	0.00%
Total	100.00%					

Source: BKKBN Annual Report (1986)

Figure 4.1: Use and Method Mix in Tangerang

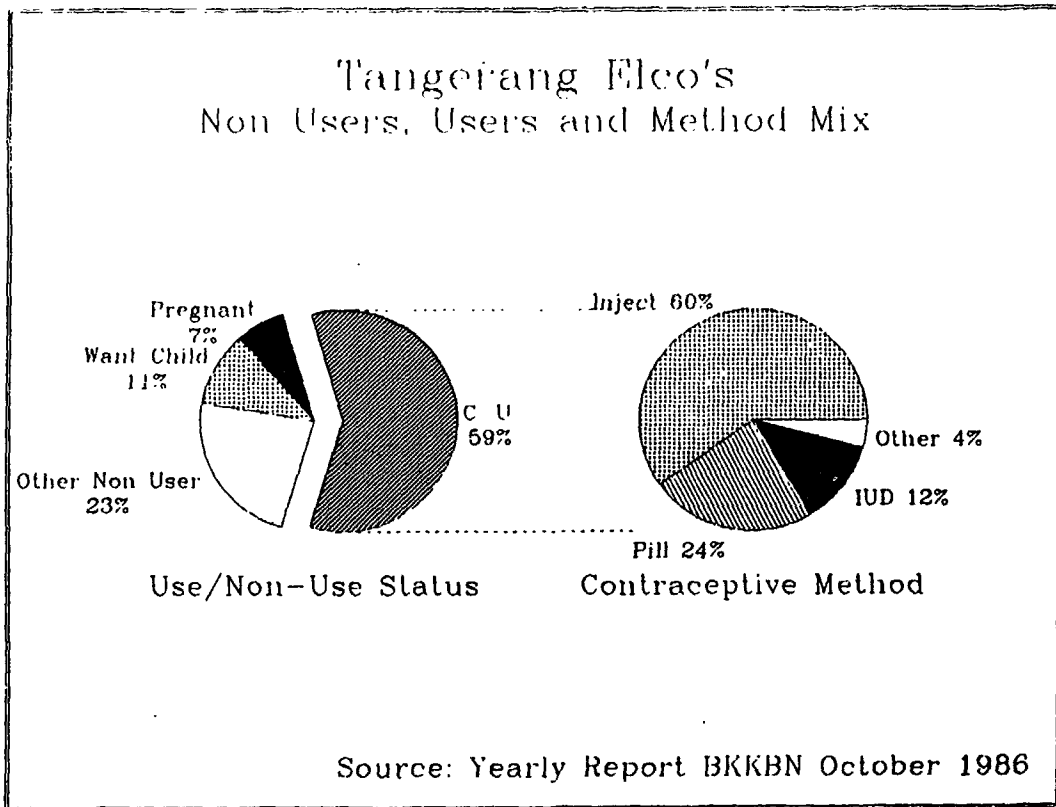


Figure 4.2: Use and Method Mix in Kulon Progo and Bantul

## D.I. Yogya-Kulon Progo Elco's

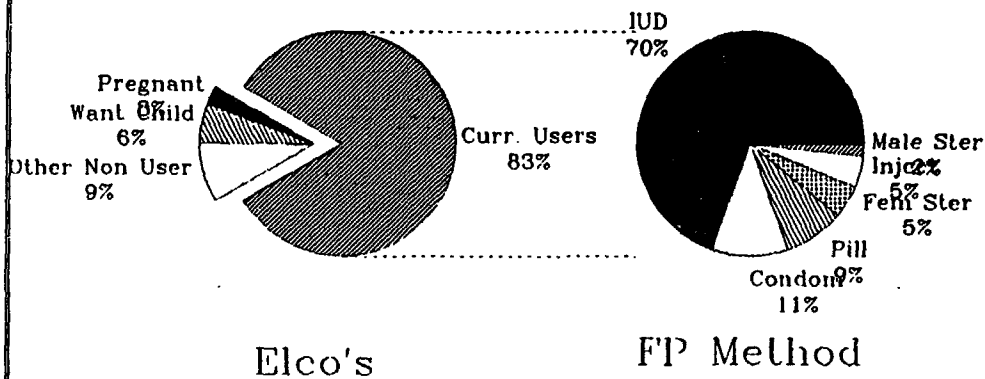
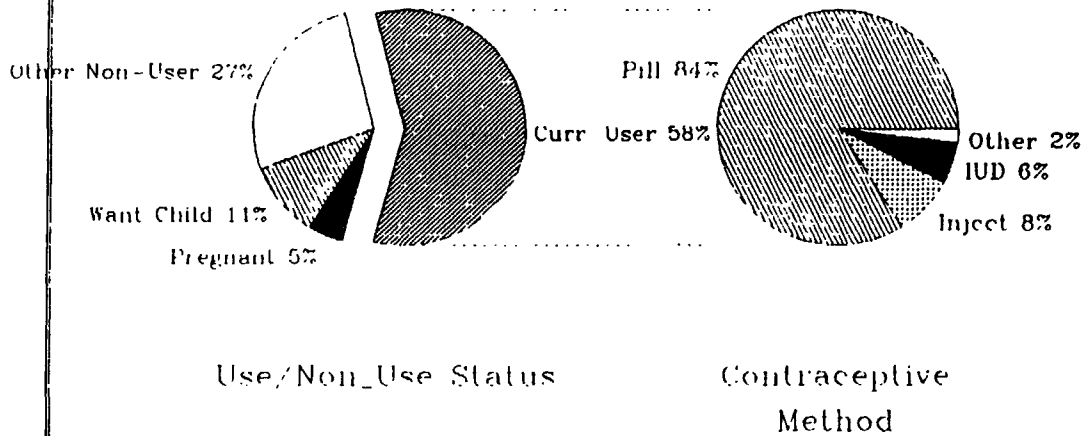


Figure 4.3: Use and Method Mix in South Kalimantan



Source Annual Report BKKBN October 1986

#### 4.5. Contraceptive Use by Method

Three distinct patterns can be seen, essentially distinguished by province:

- a) in Tangerang the most common method is by injectables (60 percent) followed by the pill (almost a quarter) with a very low level of condom use (figure 4.1);
- b) in the DI Yogyakarta regencies the IUD is the most common method (70 percent and 50 percent) followed by the pill and the condom, with injectables composing less than 10% of the users (figure 4.2).
- c) In the South Kalimantan regencies, 80-90 percent of contraceptors use the pill, 10 percent or less use an IUD or injectables. Condom use is negligible (figure 4.3).

#### 4.6. New Users

The difference between 1985 and 1986 users represents net new users to the program. They follow the model pattern of their regencies and reinforce them (table 4.4). Thus, in Tangerang, 86 percent of new users are protected by injectables; in Kulon Progo 84 percent by IUDs, and most new users in South Kalimantan take the pill, though there are signs here of a shift to injectables, perhaps as they become more available.

Table 4.4: Distribution of New Users by Method

	W. Java Tangerang	D.I. Yogya Kulon Progo	Bantul	S. Kalimantan Banjar	Barito	Tapin
Eligible couples.....	284,747	44,846	81,767	56,605	27,486	16,642
Growth in no. of Elocs.....	3.92%	-0.72%	-0.67%	4.76%	3.47%	2.61%
Percentage of new users (1 year) to current users of each method						
All methods....	8.69%	-0.92%	5.36%	15.93%	11.17%	10.99%
IUD.....	11.16%	16.26%	11.77%	-0.70%	10.75%	1.40%
Pill.....	-9.92%	-29.35%	-8.33%	14.31%	9.85%	10.40%
Condom.....	34.97%	-44.03%	-6.38%	37.20%	14.78%	0.00%
Injectables....	17.62%	25.68%	20.82%	48.03%	34.08%	32.55%
Other methods..	4.89%	7.41%	16.69%	-1.98%	3.19%	23.81%

Source: BKKBN Annual Report (1986)

#### 4.6. Summary

Level of program output is a critical variable in the analysis. It is the number of family planning users served by the program, and the net addition to this number in the year of the study. The data on output collected as part of this study is highly consistent with other BKKBN service statistics. All BKKBN data sources show higher prevalence rates than comparative survey data. Method mixes, however, are highly consistent within all types of data,



suggesting only a scale effect in terms of output measurement, which needs to be considered in the cost-effectiveness discussions.

The data indicate wide variations in both prevalence and method mix across study areas. Tangerang in West Java is characterized by injectable use, Yogyakarta by IUD use, and South Kalimantan by pill use. New users have similar method mix patterns, reinforcing levels and mixes observed across regions among current users.

## 5. PROGRAM DESIGN AND DELIVERY SYSTEM

### 5.1. Introduction

In view of the coordinating role of BKKBN and the diversity of family planning delivery across provinces as illustrated by the prevalence levels and method mixes, it is crucial to examine the availability of resources that BKKBN can potentially use in family planning delivery in each location. These resources may in fact be the most formidable constraints shaping the level and nature of BKKBN's operations in any particular area. Investigation of these resources and their significance to family planning delivery in the study areas is the major aspect of the discussion in this chapter.

### 5.2. Modes of Delivery

The program operates through six main modes of contraceptive delivery:

- a) health centers (Puskesmas), including mother and child health (MCH) clinics;
- b) health sub-centers;
- c) integrated health and family planning posts (Posyandus);
- d) village contraceptive distribution centers (VCDCs); and
- e) private medical doctors, midwives and pharmacies.

The first three are part of the medical establishment under the MOH (Ministry of Health). Posyandus are community-based units that are largely

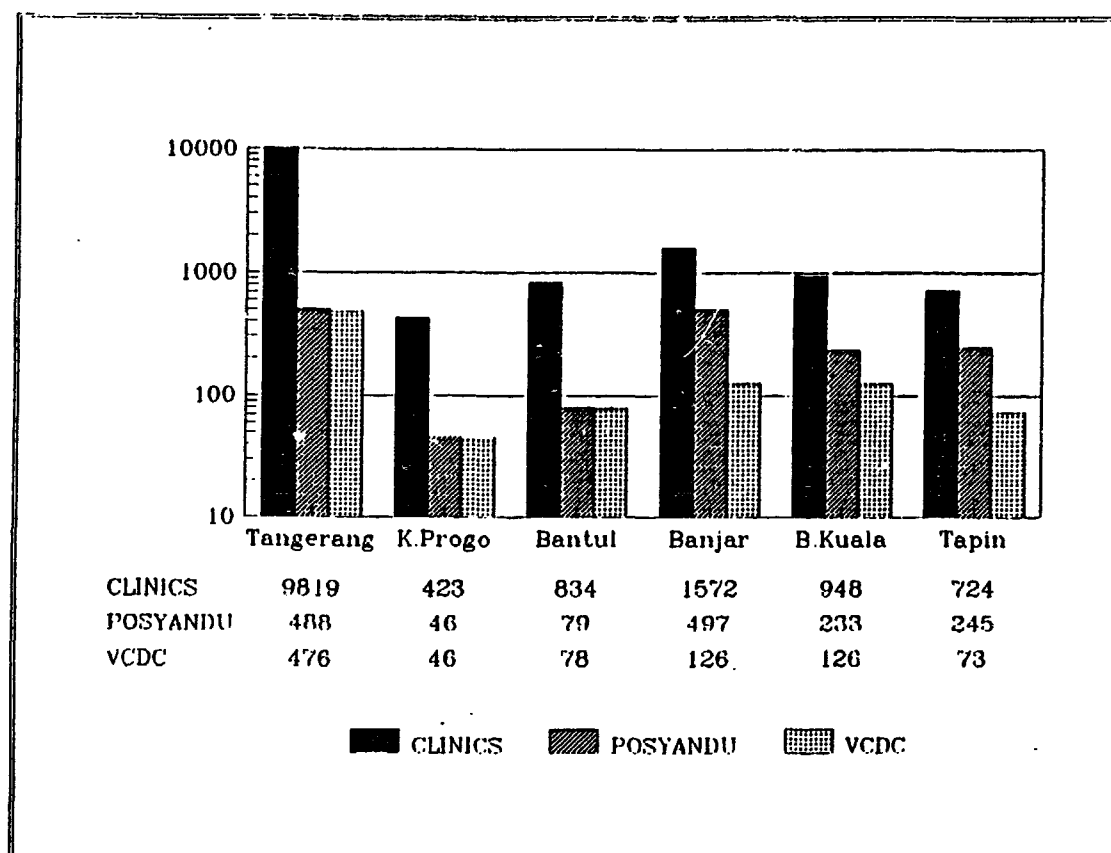
under the umbrella of the MOH, but which also receive administrative and financial inputs from BKKBN, the Ministry of the Interior, the Department of Information, and other government agencies. VDCs are operated by volunteers under the auspices of BKKBN. They provide family planning services using community resources, although contraceptives are supplied free of charge through BKKBN.

Health centers are established on an administrative basis, with usually one per sub-district, but sometimes two or even three. Sub-health centers, which primarily, though not exclusively, exist in Java-Bali, have been built to serve the health needs of large populations within given areas or populations which have poor access to health clinics. Density alone does not appear to be an overriding consideration in the location of these sub-health centers, since Tangerang, which has the largest population of all six study areas, does not have any. Mother and child health clinics are typical only of DI Yogyakarta.

Since available medical infrastructure primarily reflects historical and administrative considerations concerning health services, its allocation has generally not been influenced by family planning needs, yet it plays a crucial role in family planning delivery. The response by BKKBN to family planning needs is basically in terms of paying medical personnel to perform family planning services, as well as financial and administrative inputs into posyandus and other village institutions, including acceptor groups.

The ratio of eligible couples to formal health facilities - health centers, sub-health centers, and MCH clinics - is primarily a function of

Figure 5.1: ELOCs Served by Facility (Logarithmic Scale)



population density. In Tangerang, the most densely populated of the regencies surveyed, one such facility is available for about 9,500 eligible couples (table 5.1). This is twelve times the ratio of population to health facilities in the Kulon Progo regency of DI Yogyakarta, and fifty-five times that in the sparsely-populated Tapin province of South Kalimantan. It should be noted, though, that distances to facilities are short in Tangerang and long in S. Kalimantan. Moreover, Tangerang is adjacent to the capital Jakarta, and its population may benefit from the capital's private and public services.

Table 5.1: Facility Distribution

	Tangerang	<u>D I Yogya</u>		<u>Kalim.Sel</u>		
		Kulon Progo	Bantul	Banjar	Barito	Tapin
Total area (km <sup>2</sup> )	1020	1609	2091	2443	2621	1750
Eligible couples	284,747	44,846	81,767	56,605	27,486	16,642
Ministry of Health facilities and personnel						
Health centers	30	13	22	18	12	9
Health sub-centers	0	33	10	15	12	8
MCH	0	12	75	76	72	48
Physicians	38	14	18	12	8	7
Other medical staff	151	61	103	162	48	45
Community-base facilities						
Posyandu	277	870	695	101	100	66
VCDC	266	103	248	260	94	123
Ratio of ELOOs per						
Health center	9492	3450	3717	3145	2291	1849
Health sub-center		1359	8177	3774	2291	2080
MCH		3737	1090	726	382	347
Physician	7493	3203	4543	4717	3436	2377
Other medical staff	1886	735	794	349	573	370
Posyandu	1028	52	118	560	275	252
VCDC	1070	435	330	218	292	135

The presence of health sub-centers (HSC) and MCH clinics is related to the demographic character of the area. Such facilities are not needed so much in densely-populated areas such as Tangerang, where all inhabitants are within reasonable distance of a health center. In the rural areas of DI Yogyakarta and South Kalimantan, however, HSC and MCH clinics fulfill the function of making health care available to populations distant from health centers.

The posyandu presence in DI Yogyakarta is particularly strong, with one posyandu for every fifty-two eligible couples in Kulon Progo. In contrast, there are 1,028 eligible couples for every posyandu in Tangerang.

Of the six regencies surveyed, the family planning program in DI Yogyakarta is best-established in terms of medical infrastructure. This may help account for the superiority of its prevalence rates and common use of the IUD which is based on medical attention. It may also reflect relatively intense efforts to reach into the community for recruitment and maintenance in a population with a high rate of contraceptive use.

There is a strong VCDC presence in DI Yogyakarta, but a distinct trend toward the IUD there may lessen the role of these cadres. Lerman et al. (1989) found a positive correlation between the number of VCDCs and both IUDs and modern contraceptive methods, primarily sterilization. It appears that extensive local support for family planning activities may stimulate use of more effective forms of contraceptive, even if that support, from a supply standpoint, is geared toward the distribution of less effective methods (in this case, pills and condoms).

### 5.3. Significance of Modes of Delivery

We can assess the relative significance of the different delivery modes in distribution of contraceptives from the Clinical Reporting System. These data are broken down by:

- a) clinics, including health centers, health sub centers, and mother and child health (MCH) facilities;
- b) "outside-clinic" - activities performed by clinic medical personnel off clinic premises, including the posyandus, mobile medical teams and safaris (special campaigns promoting family planning);
- c) VCDs;
- d) the practices of private physicians;
- e) the practices of private midwives; and
- f) pharmacies.

The practices of physicians and midwives and pharmacies are private sector delivery channels which are not components of the National Family Planning Program, but report to it on the volume of contraceptives they deliver.

No distribution data were available for IUDs other than total number of new acceptors and replacements. It is clear, however, that most IUDs are delivered through health centers and sub-centers (table 5.2).

Table 5.2: Contraceptives Distributed and Distribution Channel

	W. Ja Tangerang	D.I. Yogya Kulon Progo	Bantul	S.Kalim. Banjar	Barito	Tapin
IUD	286	577	748	30	10	5
Distribution channel in percentages						
Clinic	100.0	100.0	100.0	100.0	100.0	100.0
PILL	47,382	5,112	24,489	31,035	18,576	8,211
Distribution channel in percentages						
Clinic	6.0	6.2	6.0	18.3	12.8	8.1
Outs. clinic	3.3	0.4	1.9	6.0	6.9	7.3
MD	0.2	0.0	0.0	0.0	0.0	0.0
Midwife	1.2	0.0	0.0	0.7	0.0	0.3
Pharmacy	1.8	0.0	0.0	0.0	0.0	0.1
VDC	87.5	93.4	92.1	75.1	80.3	84.3
CONDOM	903	4,359	8,291	501	103	59
Distribution channel in percentages						
Clinic	0.0	1.3	4.0	28.5	58.3	50.8
Outs. clinic	0.0	0.1	2.5	5.4	6.8	10.2
Midwife	1.3	0.0	0.7	0.0	0.0	0.0
Pharmacy	98.7	0.0	1.6	0.4	0.0	0.0
VDC	0.0	98.6	91.2	65.7	35.0	39.0
INJECTABLES	37,653	264	841	953	407	162
Distribution channel in percentages						
Clinic	38.0	82.6	63.0	78.3	87.5	83.3
Outs. clinic	57.0	11.0	24.1	11.3	12.5	12.3
MD priv. pr.	0.9	6.4	8.2	2.0	0.0	0.0
Midwife	4.1	0.0	4.6	8.4	0.0	4.3

Source: BKKEN Clinical Reporting and Recording System - November 1986

Notes: Distribution of vaginal tablets and implants was zero.

Outs. Clinic=Posyandu, "safari", mobile teams etc.

MD=MD private practice Midwife=Midwife private practice



In all regencies surveyed, more than three-quarters of pills are delivered through the VCDCs, followed by clinics and outside-clinics. The amount of pills delivered through private sector channels is negligible, but is highest in Tangerang, where supply of program facilities per eligible couple is lowest. The two DI Yogyakarta regencies each deliver over 92 percent of all pills through the VCDC. It is noteworthy that in the three South Kalimantan regencies, where the pill is most common, a greater proportion of pills is delivered through the clinics (8.1 percent to 18.3 percent) and outside-clinic activities (6.0 percent to 7.3 percent) than in other regencies. The South Kalimantan data are consistent with the hypothesis that medical infrastructure is important for new programs even when no clinical intervention is required. In Indonesia, a medical check-up is required for new pill acceptors.

Condom delivery is quite varied among the six districts surveyed. In Tangerang, the only regency where private sector channels play more than a minor role, virtually all condoms are delivered through private pharmacies. The number delivered, however, is the smallest of all the surveyed regencies. Condoms in DI Yogyakarta are almost entirely delivered through the VCDCs (98.6 percent and 91.2 percent). In the Barito Kuala and Tapin regencies of South Kalimantan, clinics deliver over half the condoms, VCDCs one-third, and the remainder by outside-clinic staff.

Outside-clinic activities are responsible for 57 percent of injectable distribution in Tangerang, being the regency with the heaviest injectable use. Clinics deliver most of the remainder. In all other regencies surveyed, injectables are delivered predominantly through the clinics, followed by

outside-clinic activities and private sector channels.

The relationship between availability of medical facilities and extent of outreach activities is not clearly a priori. On the one hand, outreach activities may substitute for a lack of medical facilities. On the other hand, as outreach activities may depend on medical infrastructure, they may be complementary. Complementarity between modes of delivery may be important in new areas where even for non-clinical methods, clients need and want medical attention. Table 5.1 and figure 5.1 show that where there is a relative scarcity of medical facilities per ELCO, there is also a relative scarcity of outreach activity per ELCO. The data suggest that all delivery mechanisms appear to complement rather than substitute for each other. This will be further explored in the next chapter.

#### 5.4. Income-Generating Schemes

It is difficult to quantify this non-delivery aspect of the program. Data were collected just on availability in the areas operated by field workers in such schemes, and on the number of participating ELCOs. No data were available on the resources available for these schemes.<sup>12</sup>

Income-generating schemes appear most commonly in DI Yogyakarta with the coconut seedling scheme being the most common, as in other areas (table 5.3). This evidence, namely that these relatively new schemes are most common in the

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<sup>12</sup> Education benefit schemes are not reported because of the negligible number reporting such schemes.

region where the program is oldest and most developed, suggests that these schemes are a reward to areas with high prevalence, and hence their impact as an incentive to recruit new users rather than retain old users remains to be investigated.

Table 5.3: Availability of Income-Generating Schemes

	% field workers reporting availability	% ELCOs partici- pating	No. report- ing
<u>Tangerang</u>			
Coconut seedling	50.7%	9.8%	134
Credit	5.9%	1.3%	134
Public utilities	8.2%	2.4%	134
<u>DI Yogyakarta</u>			
Coconut seedling	89.7%	18.5%	78
Credit	67.9%	8.3%	78
Public utilities	39.7	24.3%	78
<u>South Kalimantan</u>			
Coconut seedlings	14.1%	1.0%	64
Credit	10.9%	3.9%	64
Public utilities	7.8%	10.1%	64

### 5.5. Summary

There are dramatic differences in availability of medical infrastructure per ELCO among the study regions. These differences correlate with modes of delivery and method mix. The IUD is common where medical facilities are

relatively common and where programs are well-established (DI Yogyakarta). Outreach activity and related methods, pills and injectables, are more common where health facilities are relatively scarce. In the peri-urban areas of Tangerang, the presence of the private sector in delivery of condoms and pills is noticeable. This strict observation does not necessarily imply causality between method prevalence and infrastructure, especially since perceptions about IUDs change in new programs. At the same time, such perceptions in favor of IUDs may be facilitated by the availability of infrastructure. Still, as availability of medical infrastructure is by-and-large an exogenous factor to the family planning program, it is most likely to influence prevalence and method mix, rather than the other way around.

## 6. FIELD PERSONNEL AND OPERATIONS

### 6.1. Introduction

Locally-recruited family planning field workers (PLKB) and their supervisors (PPLKB) are key members of the National Family Planning Program. They are employed directly by BKKBN, and therefore are under its direct influence. Field workers receive a salary and have civil service status. Each field worker is responsible for two or three villages within a subdistrict. This worker's main tasks include coordinating and training village family planning volunteers (VDC volunteers), communicating with village chiefs and leaders about family planning matters, maintaining non-clinical contraceptive supplies, meeting with and motivating acceptor group members, and writing logistic and user reports. In the past, an important field worker activity was house-to-house canvassing for new acceptors. As community volunteers became more familiar with their duties, and as people became more knowledgeable about family planning, this task became considerably less important. Hence, this activity is relatively common in the Outer Islands where the program is comparatively new.

One family planning field worker supervisor (PPLKB) is assigned to each of Indonesia's 3,539 subdistricts. These supervisors oversee the activities of the four to six field workers, on the average, who work under their jurisdiction. The supervisors' responsibilities include family planning liaison with the health centers, on-the-job training of PLKB and community volunteers, coordinating activities with other agencies and departments, and

data collection, recording, and processing. The Field Control Activities Reports, which they fill out monthly, provide information about IEC workers, PLKB, VCDC and sub-VCDC volunteers, acceptor groups, and mobile medical teams.

Understanding how field workers are allocated and the factors that may affect worker productivity is an important objective of this study. BKKBN has direct administrative control only over field workers and their supervisors, and of these, has latitude only over the allocation of field workers. In order to deal insightfully with efficiency issues later in this study, it is necessary to know on what basis BKKBN distributes these workers across subdistricts, who they are and what they do, in tandem with their catchment areas, populations, and other personnel they coordinate in the community. These issues are examined in this chapter through a study of the allocation of overall field personnel participating in family planning activities, the "quality" of the personnel in terms of personal characteristics, education and training, and BKKBN's allocation criteria.

## 6.2. Field Personnel

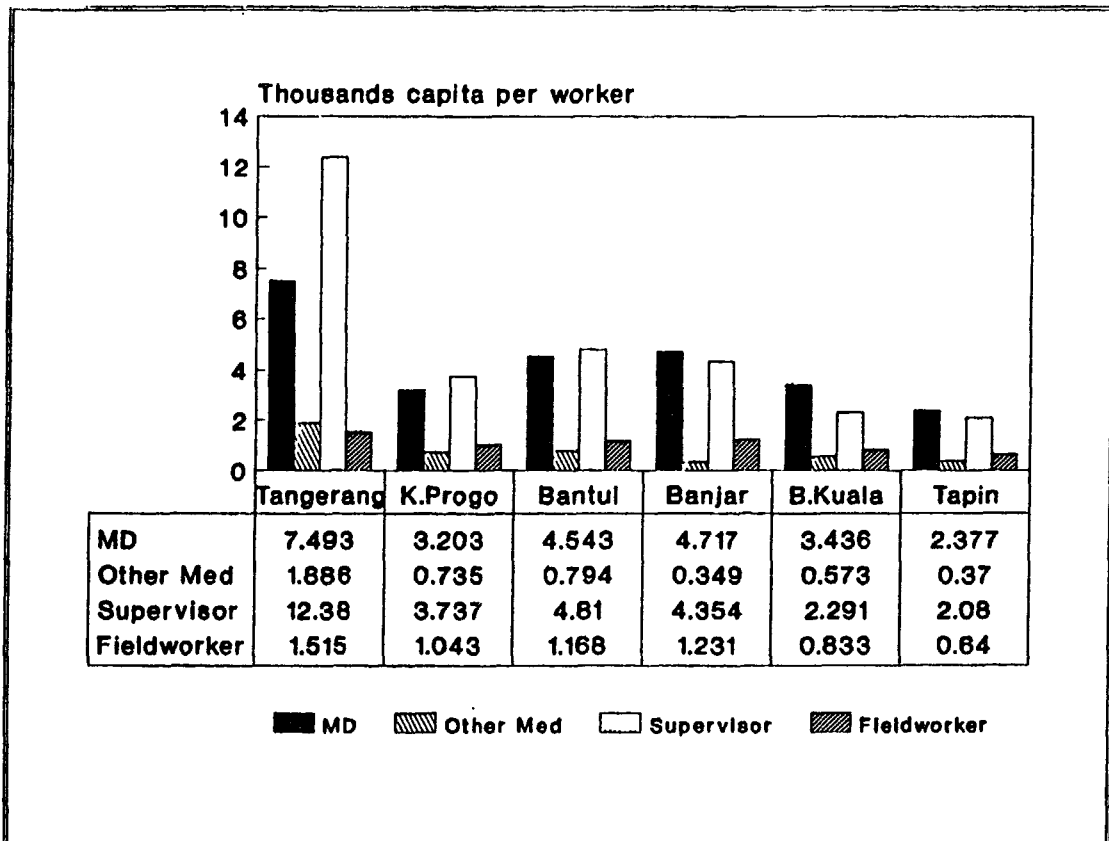
Tangerang has the highest number of ELCOs per workers of any type, followed by Yogyakarta (figure 6.1). Variations between subdistricts within areas are small. One explanation for differences across provinces may lie in urbanization and migration patterns. Tangerang is an in-migration area (see chapter 3) and these high ELCO staff ratios may simply reflect slow response of infrastructure and labor allocation to influxes of potential clients. Bantul and Banjar also have relatively large urban populations and may be areas of net migration

surplus; the former is adjacent to Yogyakarta Municipality and the latter is a transmigration destination region. Allocation strategies based on past trends may be relatively insensitive to changing client conditions.

One clear implication of this picture is that BKKBN personnel, supervisors and especially field workers need to deal with larger target populations in Tangerang, which is a relatively growing urban area. They also need to coordinate resources which are relatively scarce in this area. From the data presented in table 6.1, however, it is evident that although Tangerang field workers handle a much larger number of eligible couples than their colleagues in the other provinces, they do so in a vastly smaller average areas and numbers of villages. South Kalimantan field workers cover the smallest number of eligible couples, but this client pool is widely scattered over a wide area and relatively many villages.

Tangerang's field workers also have access to fewer non-physician medical staff. These staff are the major resource available for family planning delivery in the community. Their relative scarcity in Tangerang may imply, more pressure on field workers who need to deal with resources which are more scarce (per ELCO) compared with other regions. On the other hand, this may suggest a need for lesser coordination efforts because of fewer medical personnel in a more concentrated area.

Figure 6.1: Family Planning Field Personnel  
in the Population





### 6.3. Field Worker Allocation

Is there any rule guiding the allocation of field workers, given the observed variance in their allocation to target populations, areas, and clinical personnel they need to coordinate?

Regression analysis (table 6.2) indicates the impact that selected predisposing variables have in determining the allocation of field workers by subdistricts. In all three areas, field workers are allocated by numbers of eligible couples; for Tangerang and South Kalimantan, number of villages also appears to act as an allocative criterion. It is interesting to note that the coefficients for eligible couples are virtually identical across regencies. This implies a rather strict allocation rule. This rule does not correct, however, for past and other regional differences. The "constant" is both positive and significant for Yogyakarta, and regression  $R^2$  is by far the lowest. This suggests that the distribution of field workers is relatively uniform across sub-districts in Yogyakarta, and "responds" less to some concept of need. In the other two provinces however, it responds to target population size and population distribution. The  $R^2$  in Tangerang is the highest of all regions, which indicates that it responds most to some concept of need because the predisposing variables explain more than in other regencies variations in field worker allocation.<sup>13</sup>

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<sup>13</sup> All statistics in this study refer to the entire population in a study area. Statistical inference must be done with this fact in mind. Statistics should be used mainly for their predictive value.

Table 6.1: ELOCs, Villages, Area, and Med. Staff per Field Worker

	Tangerang	DI Yogyakarta	South Kalimantan
ELOCs	1437	1199	882
Villages	1.84	1.23	5.71
Area (Sq. hec.)	658.85	3477.20	7098.81
Non-physician medical staff	.81	1.44	2.50

Table 6.2: Determinants of Number of Field Workers,  
Linear Regression Results; No. of Field Workers in  
Sub-district as Dependent Variable

	Tangerang	DI Yogyakarta	South Kalimantan
Constant	2.441 (1.72)	3.260 (2.61)	-3.77 (-0.38)
Eligible couples	3.5E-4 (4.05)	3.4E-4 (2.68)	3.9E-4 (3.11)
Children per eligible couple	-2.300 (-1.34)	-1.656 (-0.77)	2.699 (1.92)
Villages	.313 (5.68)	-.052 (-0.80)	.052 (2.50)
Area	-2.7E-4 (-1.42)	1.0E-4 (0.81)	-1.7E-5 (-0.21)
Non-physician medical staff	.154 (1.52)	.064 (0.95)	.050 (-1.36)
F	23.96	1.99	12.49
Adjusted R <sup>2</sup>	.86	.16	.66

The estimated coefficients suggest that more field workers appear to be found in South Kalimantan villages with more children below five per eligible couple.

It appears that in Tangerang worker allocation "responds" somewhat to medical infrastructure measured by non-medical staff. This indicates that the program there may indeed take advantage of availability of medical staff who support the injectable. On the whole, infrastructure does not appear to influence BKKBN's field staff allocation.

#### 6.4. Worker Characteristics

Worker characteristics could play an important role in labor productivity, especially when the number of workers constrains output improvement. In BKKBN, assessment of labor need and labor recruitment occur at the regency level. With the recent decree granting civil service status to family planning field workers, BKKBN promulgated regulations stipulating that workers have at least high school education.

Table 6.3: Worker Characteristics <sup>a</sup>, by Type

	W. Java Tangerang	D.I. Yogya Kulon Progo Bantul			S. Kalim. Banjar Barito Tapin		
TOTAL							
FP Supervisors	28	11	14	12	11	8	84
FP Field Workers	188	43	63	43	33	26	396
Medical Staff <sup>b</sup>	189	74	122	174	53	52	664
FP Volunteers	1320	654	687	362	268	196	3487
MEAN AGE							
FP Supervisors	35	42	39	32	33	32	36
FP Field Workers	32	34	36	29	27	29	32
Medical Staff	35	36	38	35	31	34	35
FP Volunteers	37	43	40	39	36	39	39
PERCENT MALES							
FP Supervisors	86	73	71	75	100	75	81
FP Field Workers	61	46	41	58	52	62	55
Medical Staff	35	32	27	41	58	48	38
FP Volunteers	29	19	20	55	52	32	30
PERCENT MARRIED							
FP Supervisors	89	91	100	92	100	88	93
FP Field Workers	81	70	84	65	52	65	75
Medical Staff	85	89	89	84	66	85	84
FP Volunteers	91	94	94	90	86	87	91
MEAN NUMBER OF CHILDREN							
FP Supervisors	2.78	3.55	2.36	1.38	1.82	1.12	2.39
FP Field Workers	1.91	1.38	2.08	0.74	0.45	0.77	1.61
Medical Staff	2.22	2.23	2.25	2.32	1.58	1.90	2.18
FP Volunteers	3.42	3.68	3.19	3.42	2.81	2.77	3.34
PERCENT JUNIOR HIGH SCHOOL GRADUATE OR ABOVE							
FP Supervisors	87	91	100	100	100	100	91
FP Field Workers	4	83	85	99	100	100	87
Medical Staff	86	85	81	62	81	81	78
FP Volunteers	27	45	58	44	30	35	40

<sup>a</sup>) Includes all workers participating in the study. Response rate was over 95 % for all categories.

<sup>b</sup>) Includes physicians, nurses, midwives, auxiliary midwives and paramedics.

Table 6.3 reveals differences in worker characteristics between personnel types within one region and also differences in the characteristics of one personnel type across regions. The mean age, in the mid-thirties, of the four types of workers is relatively similar. This indicates a program decision to recruit mature and educated personnel. Workers are slightly younger in Tangerang and South Kalimantan, which may reflect the age structure of the local labor pool as well as the age of the program. Field workers are the youngest group and volunteers the oldest.

The majority of family planning supervisors are male, as are a slight majority of field workers. Most medical staff members are female, although within this general category, physicians are primarily male. Family planning volunteers tend to be wives of village heads or other community elites. Compared with other areas, DI Yogyakarta regencies have higher proportions of female workers, which may reflect the relatively high status accorded to Javanese women. IUDs are the favored method in DI Yogyakarta (see chapter 4), not older than Tangerang's, and this may partly be a function of the higher female component of the family planning and medical personnel.

Marital status patterns follow age patterns, with older workers the most likely to be married. This holds true both for regions and for different worker types within one region. The same pattern pertains to mean number of children; older workers tend to have more children. DI Yogyakarta workers thus are most likely to be married and have high mean numbers of children compared with their counterparts in the other study areas.

Educational patterns, however, are mixed. Field workers and their supervisors are uniformly well-educated, especially in the South Kalimantan regencies. The higher proportions of well-educated staff in South Kalimantan may be a product of their younger average age and also their lower seniority. As mentioned, regulations now mandate secondary education credentials for recently-hired family planning workers.

Medical staff education, largely influenced by the education of paramedical staff, is low in Banjar. This is in part a result of the medical personnel mix in the area. One possible reason could be the difficulty in recruiting qualified medical personnel for Outer Island areas. The wide range of educational levels within the medical staff category reflects both the university degrees of physicians, and the elementary school education of many auxiliary nurses and paramedics.

Family planning volunteers have the lowest education of all personnel categories, although levels are highest in DI Yogyakarta. This may reflect their age and mirror their population of origin.

#### 6.5. Training and Experience

Experience and training are considered important variables influencing worker effectiveness. There are few seniority differences between the various personnel types (table 6.3). Generally, personnel in Kulon Progo and Bantul are more experienced than their counterparts elsewhere, this of course being

related to their older average age and age of the program. Comparing mean work experience with mean age reveals that most personnel were hired in their mid-twenties, and that they have been working steadily in the health and family planning arena, evidently without much turnover. Their civil service status offers them a secure income and position, and thus there is little incentive to seek employment elsewhere in a country where employment, especially of people with high education, is an issue.

Supervisors received the most family planning training, followed by field workers and medical personnel. DI Yogyakarta supervisors and field workers received substantially more training than those in the other regions, although this was not the case for medical personnel.

Most personnel, no matter what type, receive basic training in family planning and IEC. Striking interregional differences do not appear on this dimension, except that South Kalimantan medical personnel receive less family planning and IEC training than their counterparts elsewhere. Again, this may reflect the relatively short history of the program in this area and distance from Java. This finding may reveal a program shortcoming, because, as shown in the previous chapter, clinics in South Kalimantan are a prominent delivery mode for recurrent contraceptives.

Medical personnel receive more training about long-term methods (IUDs, implants, and female sterilizations) than other personnel types. This finding particularly pertains to Tangerang and DI Yogyakarta medical personnel. Given its high IUD prevalence rate, the high proportions of workers receiving training

on this method in DI Yogyakarta is predictable. For reasons not fully clear, Tapin workers also receive substantial training on IUDs. Both Bantul and Tapin personnel get noticeably more training in female sterilization than do those elsewhere.

More training is given on IUDs than on the other methods, an entirely predictable finding given its higher prevalence rate. Nevertheless, considerable training is also offered on implant and female sterilization in Bantul, suggesting that these methods may be slated for greater prominence in the mature program regions.

Most field workers and their supervisors receive training in reporting and administration, although the proportions are comparatively low for South Kalimantan field workers. The majority of medical personnel also receive reporting and administration training; again, the figures are lower for South Kalimantan than elsewhere.

Training appears to mirror local delivery conditions and the history of the program in any area. In South Kalimantan, distances may also adversely affect training, as it may be costlier to assemble workers.

This wide variation in training curricular both within and between provinces suggests that much of the decision-making on this dimension originates at the local level, perhaps in response to method allocations and client demands. On the whole, the data may be confounded by a tendency of workers to confuse formal training with experience.



#### 6.6. Workers' Activities

Field workers and their supervisors spend about 40-50% of their time in promotion activities ("search for new acceptors and mapping", IEC, and "beyond family planning"); about a quarter in supply-related activities ("organization of delivery", "coordination and organization in the community" and "supervision"); and an equal share of work time in administration (Fig. 6.2). That is, BKKBN's staff spends most of its time on search and recruitment of new users rather than on delivery. In most areas (data not shown), especially those of Yogyakarta, field workers spent more time on administration than on delivery. Only the field workers of Tangerang and Tapin spent more time on delivery-related activities than on administration.

Differences in the allocation of time of BKKBN's field personnel across regions are generally similar. Moreover, across regions and especially within regions, field workers and supervisors have fairly similar distributions of time allocation. The latter group spend somewhat less time on recruitment and promotion. Hence, supervisors are "first among equals"; they do not spend more time than their subordinates on supervision and administration.

These data indicate that the variance prevalence rates and method mix across provinces is not mirrored in what field workers and their supervisors do; their activities are relatively uniformly distributed.

Figure 6.2: Activities of Field Workers and Supervisors

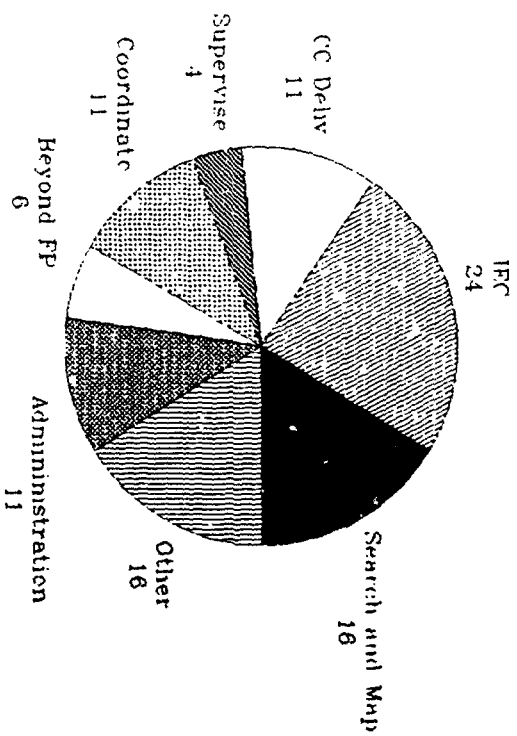


Figure 6.3: Activities of Physicians

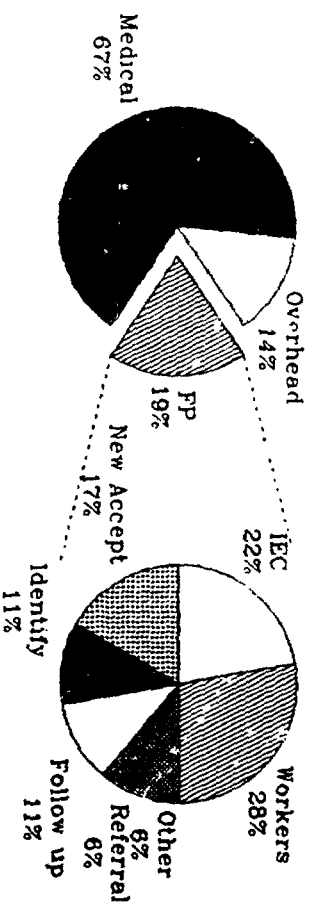
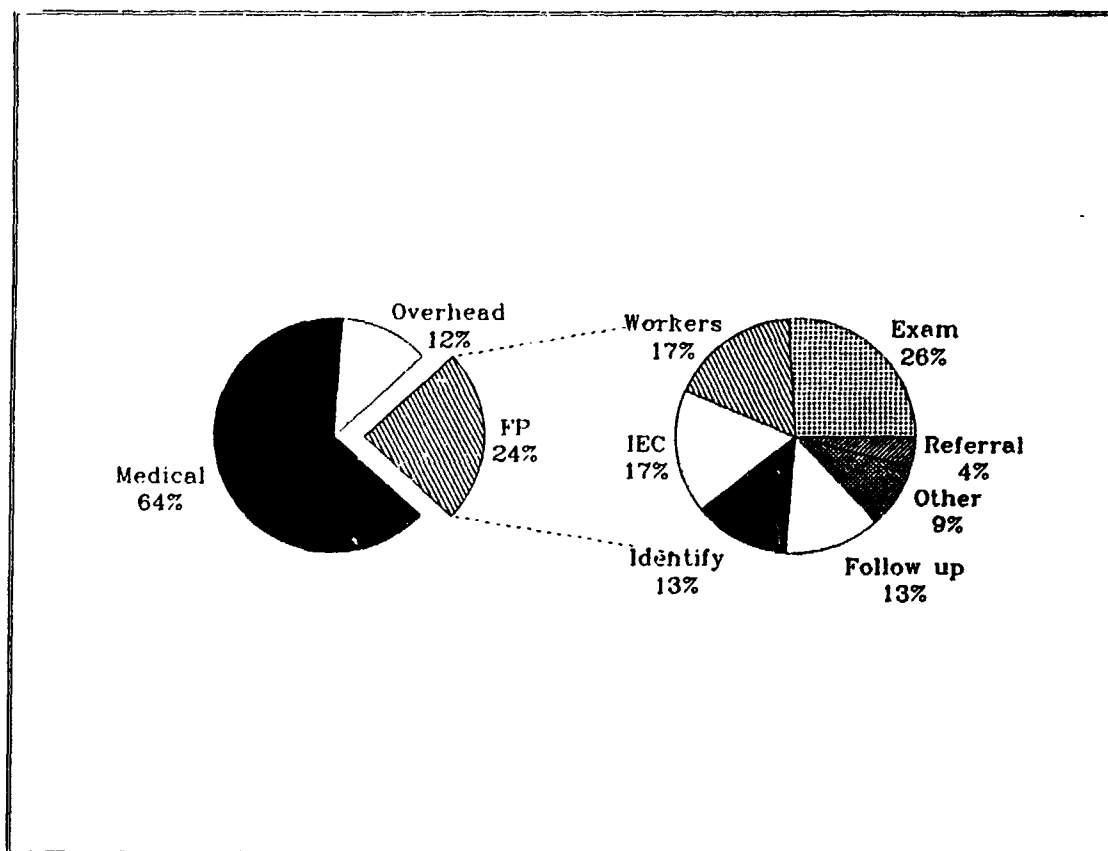


Figure 6.4: Activities of Non-Physician Medical Staff



Health center physicians spend about one-fifth of their work time in family planning activities (figure 6.3). One-half of this time is devoted to IEC and supervising and coordinating workers. Physicians allocate approximately two-fifths of their time to activities involving face-to-face contacts with family planning clients, namely, obtaining information about new acceptors, dealing with referrals, and performing follow-up procedures.

Non-physician medical staff spend about one-quarter of their time on family planning (figure 6.4). Approximately one-third of this time is devoted to supervision and coordination, and the remainder largely to face-to-face contacts with clients. Initial clinic examinations are almost exclusively

performed by these staff members.

#### 6.7. Summary

Considerable variations are observed across regions in the allocation of labor in relation to their jurisdictions. Tangerang has the highest ratio of eligible couples to all personnel types, which may suggest the inability of the program to respond quickly enough to rapidly changing demographic conditions.

Tangerang's field workers need to deal with far larger populations using fewer other resources per ELCO than their counterparts in the other areas. They benefit, however, from a relatively high population density.

At the same time, within each of the areas, labor allocations appear to be based more evenly and there is some rational decision-making in all three provinces; allocation of field workers is on the basis of ELCOs, villages and area of coverage. It is less so in DI Yogyakarta and more so in Tangerang, where resources are relatively stretched. This may suggest that local managers are more responsive to some criteria of need in allocating scarce resources than central management, especially in newly emerging program areas. Where the need is more pressing, as in Tangerang, responsiveness is greater than where it is not, as in Yogyakarta. However, differences in terms of method mix and other aspects between the areas may be justified in some degree by variations in labor inputs across regions.

Workers basically mirror their target population and the age of the program. DI Yogyakarta has a larger share of workers who are older, female, more experienced, and better-trained. This may suggest few changes in personnel in view of need as the program matures in some areas, and allocation across regions.

Time allocation for both field workers and their supervisors is mainly divided between demand generation, supply, and administrative activities. This is similar across regions. Both groups of workers spend most of their time on search and promotion activities, with rather uniform time allocation patterns across areas. This may suggest that workers report working "by the book", and gives rise to the hypothesis that on the whole they may be underutilized; there is no obvious pressure to respond to local variations in need. If there is such pressure, it may exist in Tangerang.

Medical staff spent about one-quarter of their time in family planning activities.

Family planning worker characteristics and time allocations will be used in subsequent analysis in order to determine what effect they have on output.

## 7. PROGRAM COST

### 7.1. Introduction

Although it is essential in order to assess the social efficiency of the program and the cost-effectiveness of alternative operations, the value of the resources used in promoting and delivering family planning discussed in the previous chapter has never been fully assessed in Indonesia. Cost elements, such as capital costs, the value of volunteers' time, and even the value of staff time, are not completely accounted for in recurrent budgets. Moreover, in the absence of detailed accounts, the allocation of cost to specific operations is often complicated or outright impossible. The issue is particularly acute in Indonesia, where many institutions contribute to family planning operations. However, knowledge of the level and composition of the cost of contraceptive delivery, and of who shares its burden, is essential to program evaluation, policy formulation, and programming.

In this chapter we seek to identify:

- a) the value or cost of the resources used in family planning delivery;
- b) the cost structure by types of inputs - fixed vs. variable costs;
- c) the contribution of BKKEN, MOH (Ministry of Health), and the community to the cost; and,
- d) the unit cost per ELOO and user of alternative family planning operations - promotion, delivery and administration.

Resources are grouped by major types: labor, capital (buildings and equipment), and supplies (contraceptive supplies and purchased services).

Costs of inputs per ELOO are evaluated in order to measure the intensity of program effort in each of the study areas. The cost data are related to program output or number of users in order to assess the relative cost-effectiveness of BKKEN's operations and alternative program strategies.

## 7.2. Labor Cost<sup>14</sup>

Labor costs are allocated by the following personnel types:

- PPLKB, or family planning field worker supervisors;
- PLKB, or family planning field workers;
- MDs, or clinic physicians;
- Other medical staff, or clinic nurse-midwives, auxiliary midwives, and paramedics;
- Other staff, or non-medical personnel such as clinic administrative staff; and
- PPKBD, or village family planning volunteers.<sup>15</sup>

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<sup>14</sup> Labor cost is computed according to the actual staff size in each region. This is marginally different from the number of workers participating in the study [See note in Table 6.3]. Average wages were computed based on the information received from participating workers.

<sup>15</sup> We include only the family planning portion of "MDs" and "other medical staff" cost, basing it both on the time these personnel reported they worked in family planning activities and on their average government wages. We imputed "wages" of village family planning volunteers based on an equation adopted from income function estimates of 3,000 workers from East Java in 1982. Characteristics of these workers matched characteristics of the volunteers in this study. We estimated their work time as follows: for each posyandu we designated three volunteers for two days per month, and for each VCDC we designated one volunteer for four days per month. These are considered

Table 7.1: Labor Costs by Type of Staff  
in Rupiah per ELO per month

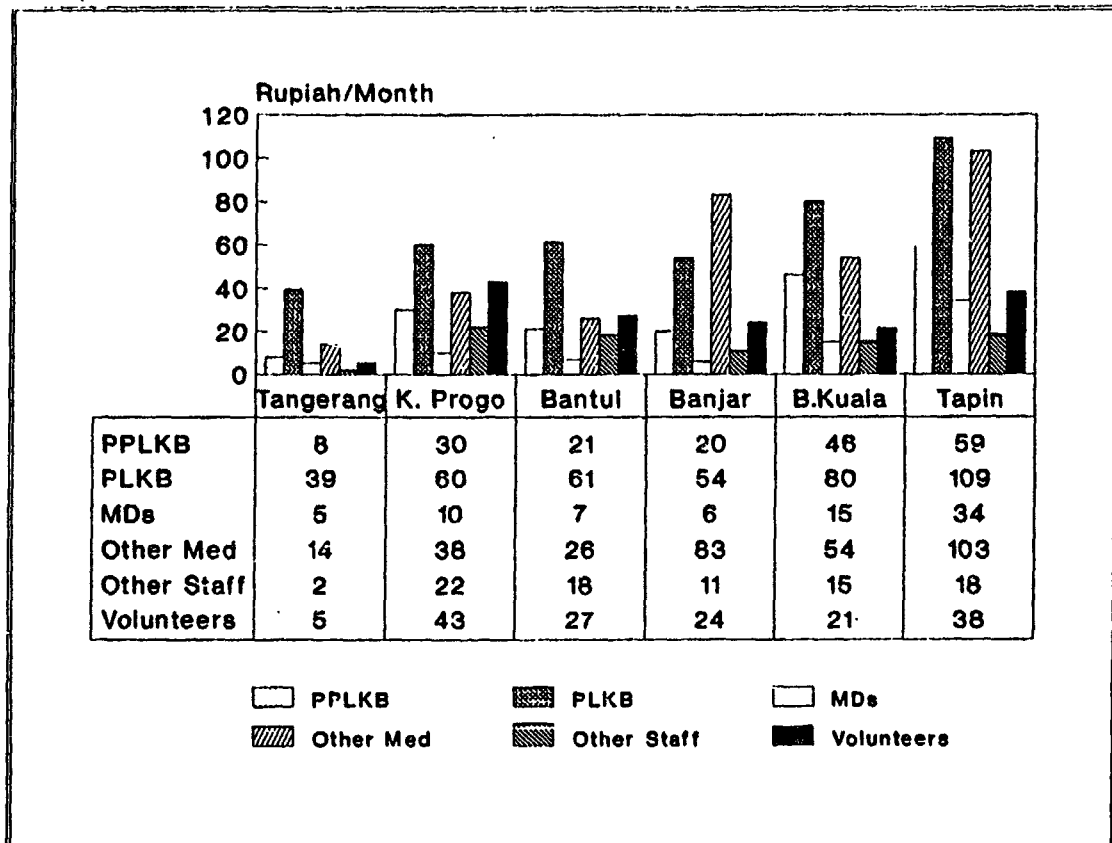
	W. Java Tangerang	D I Yogya Kulon Progo	Bantul	Banjar	Kalim. Barito	Tapin	Mean <sup>a</sup> (in Rp.)	Distri- bution
Supervisors	11%	15%	13%	10%	20%	16%:	30.7	15.0%
Fieldworkers	53%	30%	38%	27%	35%	30%:	67.2	32.9%
MD's	7%	5%	4%	3%	6%	9%:	12.8	6.3%
Other med. staff	19%	19%	16%	42%	23%	29%:	53.0	25.9%
Other Staff	3%	11%	11%	6%	6%	5%:	14.3	7.0%
Volunteers	7%	21%	17%	12%	9%	11%:	26.3	12.9%
						:		
Total (in RPS.)	100% (73)	100% (203)	100% (160)	100% (198)	100% (231)	100%: (361):	204.3	100.0%

<sup>a</sup> Simple mean across regions

minimal time inputs. It is assumed throughout the discussion that all resources have opportunity cost; MDs and other medical staff could treat patients when they handle family planning users, and volunteers could use their time productively and leisurely when not engaged in family planning activity.



Figure 7.1: Labor Costs by Type of Staff



There are substantial differences in worker costs per ELCO between Tangerang, which has the lowest monthly labor cost, and South Kalimantan, which has the highest (table 7.1, figure 7.1). In Tapin, labor costs are between four and five times higher than those in Tangerang. The DI Yogyakarta regencies, Kulon Progo and Bantul, lie between these extremes. These variations reflect in part population densities, because, as shown in chapter 6, eligible couples by personnel type ratios are highest in Tangerang, followed by fairly uniform levels in the other areas.

BKKBN staff, field workers, and supervisors account for more than 48 percent of labor costs, while medical personnel account for about 32 percent. That is, BKKBN personnel account for only about one-half of the value of labor resources employed in family planning delivery. Administrative and support staff account for the remaining seven percent. The imputed labor cost of community family planning volunteers constitutes roughly 12 percent of the total labor cost. This cost is lowest in Tangerang and highest in Kulon Progo.

#### 7.2.1. Types of Labor Income

Salaries and honoraria constitute 87 percent of average total incomes of PLKBs (field workers) and 79 percent of average total income of PPLKBs (field worker supervisors) (table 7.2). Compared with PLKB labor-related incomes, PPLKB salaries are more varied and on the average, PPLKBs report incomes 58

Table 7.2: Monthly Earnings by Worker Type and Type of Income

	Tang.	Kulon Progo	Ban- tul	Ban- jar	Barito Kuala	Tapin	Mean <sup>a</sup> (in Rp.)	Distri- bution
<b>FIELD WORKERS (PLKB)</b>								
Wages	60%	77%	66%	67%	82%	70%	53.0	70.04%
Per Diem	0%	0%	7%	0%	0%	1%	1.2	1.54%
Travel	3%	0%	0%	1%	1%	2%	1.0	1.32%
Honoraria	22%	17%	16%	19%	10%	20%	13.2	17.40%
Other pay	15%	6%	11%	13%	7%	6%	7.3	9.69%
Total	100% (73) <sup>a</sup>	100% (69)	100% (88)	100% (72)	100% (71)	100% (81)	75.7	100.00%
<b>SUPERVISORS (PHKB)</b>								
Wages	64%	78%	74%	83%	83%	65%	84.0	74.12%
Per Diem	17%	12%	11%	3%	6%	6%	10.5	9.26%
Travel	0%	1%	1%	0%	2%	1%	0.8	0.74%
Honoraria	10%	2%	2%	8%	3%	6%	5.3	4.71%
Other pay	9%	8%	13%	6%	7%	23%	12.7	11.18%
Total	100% (111)	100% (120)	100% (114)	100% (90)	100% (118)	100% (127)	113.3	100.00%
<b>MEDICAL DOCTORS</b>								
Wages	41%	64%	41%	46%	56%	79%	165.8	53.09%
Per Diem	4%	0%	1%	2%	2%	2%	6.0	1.92%
Travel	5%	0%	2%	2%	3%	7%	10.5	3.36%
Honoraria	36%	30%	49%	31%	28%	10%	99.3	31.80%
Other pay	14%	6%	8%	18%	11%	1%	30.7	9.82%
Total	100% (364)	100% (205)	100% (402)	100% (289)	100% (303)	100% (311)	312.3	100.00%
<b>OTHER MEDICAL STAFF</b>								
Wages	67%	80%	66%	82%	71%	81%	93.0	74.50%
Per Diem	2%	0%	1%	1%	2%	11%	3.5	2.80%
Travel	2%	3%	2%	3%	3%	1%	3.0	2.40%
Honoraria	15%	12%	18%	11%	10%	5%	15.0	12.02%
Other pay	14%	4%	13%	3%	13%	2%	10.3	8.28%
Total	100% (123)	100% (123)	100% (136)	100% (107)	100% (129)	100% (131)	124.8	100.00%

<sup>a</sup> Total earnings (in 1000 Rp per month) in parentheses.

percent higher than those of PLKBs. Most of the difference is accounted for by salaries and honoraria, which are centrally determined by BKKBN.

Tangerang reports the lowest base salary (60 percent of Rp.73,000/month, or Rp.44,000/month) compared with the other regencies. Hence, BKKBN labor costs in Tangerang are lowest not only because of BKKBN's lower allocation of resources per ELCO to the regency, but also because of the relatively low salaries it allocates to Tangerang's personnel. Given the different characteristics and activities of field personnel as outlined in the previous chapter, and the relatively small variation in salaries, the data suggest a fairly uniform pay scale with little consideration to variations in characteristics and types of operation.

MDs stand out as above average both in levels of reported incomes and the shares they report as honoraria.

#### 7.2.2. Labor Funding

BKKBN funds about 4.5 percent of the physicians' government salaries and a somewhat higher percentage of other medical staff salaries (table 7.3). Notably, even BKKBN staff report incomes from other sources, including MOH, for travel and related expenses. In Tangerang, where the pay from BKKBN for its workers is low and alternative employment opportunities are possibly better, field personnel report greater earnings from other sources. BKKBN contributes a greater share of physicians' incomes in South Kalimantan where, because of the apparent dearth of private practice opportunities, MD salaries

are lower and work in family planning is higher.

BKKBN is responsible for about 49 percent of labor costs, covering its own personnel and part of the cost of medical personnel (table 7.4). MOH handles some 38 percent of labor costs, and the community 13 percent.<sup>16</sup> From BKKBN's viewpoint, it is basically its own share that matters. From the viewpoint of the government, it is the cost of BKKBN and MOH. From the viewpoint of Indonesian society, it is all contributions, including those of the community. It is noteworthy that the share of cost to BKKBN is highest in Tangerang where the public sector medical infrastructure is lagging. In absolute terms, labor cost is still higher in the other areas than in Tangerang because of low population densities and contributions to medical staff in those areas in comparison with Tangerang.

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<sup>16</sup> These percentages are based on the data presented in table 7.3.

Table 7.3: Distribution of Earnings by Type of Staff and Source of Funding

	Tang.	Kulon Progo	Ban- tul	Ban- jar	Barito Kuala	Tapin	Mean <sup>a</sup> (in Rp.)	Distri- bution
FIELD WORKERS (PLKB)								
MOH	3%	1%	1%	4%	1%	9%	2.5	3.30%
BKKN	79%	90%	80%	88%	93%	79%	64.0	84.40%
Other Government	1%	1%	1%	1%	3%	8%	2.0	2.64%
Other	16%	7%	18%	7%	3%	5%	7.3	9.67%
Total	100% (73) <sup>a</sup>	100% (69)	100% (88)	100% (72)	100% (71)	100% (81)	75.8	100.00%
SUPERVISORS (PPLKB)								
MOH	4%	0%	0%	0%	0%	5%	1.7	1.47%
BKKN	93%	95%	90%	98%	89%	94%	105.3	92.94%
Other Government	0%	2%	0%	1%	3%	2%	1.3	1.18%
Other	4%	3%	10%	1%	8%	0%	5.0	4.41%
Total	100% (111)	100% (120)	100% (114)	100% (90)	100% (118)	100% (127)	113.3	100.00%
MEDICAL DOCTORS								
MOH	45%	73%	47%	53%	55%	85%	180.8	57.90%
BKKN	3%	2%	1%	7%	5%	9%	13.7	4.38%
Other Government	2%	3%	4%	4%	6%	0%	9.8	3.15%
Other	51%	22%	48%	36%	34%	6%	108.0	34.58%
Total	100% (364)	100% (205)	100% (402)	100% (289)	100% (303)	100% (311)	312.3	100.00%
OTHER MEDICAL STAFF								
MOH	72%	76%	66%	84%	76%	91%	96.3	77.17%
BKKN	3%	8%	4%	6%	7%	8%	7.5	6.01%
Other Government	0%	2%	0%	1%	2%	1%	1.0	0.80%
Other	25%	15%	30%	8%	16%	1%	20.0	16.02%
Total	100% (123)	100% (123)	100% (136)	100% (107)	100% (129)	100% (131)	124.8	100.00%

<sup>a</sup> Total earnings (in 1000 Rp. per month) in parentheses

Table 7.4: Labor Cost, by Source of Funding  
in Rupiah per ELO per month

	Tang.	Kulon Progo	Ban- tul	Ban- jar	Barito Kuala	Tapin	Mean (in Rp.)	Distri- bution
BKKEN	64%	46%	52%	39%	58%	46%	100.0	48.95%
MCH	29%	33%	31%	49%	32%	44%	78.0	38.18%
Community	7%	21%	17%	12%	9%	11%	26.3	12.89%
Total	100%	100%	100%	100%	100%	100%	204.3	100.00%
	(73)	(203)	(160)	(198)	(231)	(361)		
Total Labor Cost/ BKKEN Contribution	1.6	2.2	1.9	2.6	1.7	2.2		

Table 7.5: Zero-Order Correlation Coefficients of Subdistrict Level Labor Costs Per ELCO by Source of Funding

	<u>BKKBN</u>	<u>MOH</u>	<u>Community</u>
BKKBN	1.00		
MOH	0.82	1.00	
Community	0.57	0.61	1.00

The data in Table 7.5 demonstrate that BKKBN, the MOH and the community support health and family planning workers in a complementary manner. Higher-than-average expenditures per ELCO by the MOH are typically associated with higher-than-average expenditures by BKKBN. Higher-than-average community expenditures are also associated with higher-than-average BKKBN and MOH expenditures, though the association is not as great as that between BKKBN and MOH.

It is important to keep in mind for the forthcoming discussion that in respect to labor costs, the cost of medical staff borne by MOH is mainly a fixed cost, as it does not vary much with the level of family planning activity. BKKBN's labor costs are quasi-fixed (for individual operations) with respect to its own staff, and are variable with respect to medical staff because the latter are paid by level of activity. Community costs are variable.

### 7.3. Capital Cost: Types and Source of Funding

Although usually not accounted for in the recurrent budgets of family planning, the relationship between this cost and variable labor and supply



costs is essential to the identification of efficient method mix and delivery modes. Disregard for this cost distorts the real cost of delivering different methods of family planning, as is often the case with clinically-based methods such as IUD. Capital cost comprises five categories:

- a) buildings and land;
- b) general equipment, including most furniture, and non-medical and non-family planning equipment;
- c) family planning equipment, including all equipment used exclusively for family planning, such as IUD and sterilization kits;
- d) medical equipment, including all equipment which has medical uses, regardless of whether it has family planning uses; and,
- e) transportation equipment, including cars, vans, motorcycles, etc. operated by the different facilities.

Capital cost relates to the five different types of facilities which are the basic modes of contraceptive delivery of the program. They include:

- a) health centers or puskesmas (HC);
- b) health sub-centers (SubHC);
- c) mother and child health facilities (MCH);
- d) integrated health posts (posyandus);
- e) village contraceptive distribution centers (VCDC).

The discussion here concerns only that portion of total capital cost that is allocated to family planning. The capital cost of medical facilities is allocated to this activity according to the proportion of time medical staff report in family planning activities. The equivalent of rental values was put

on buildings, and a depreciation rate, straight line on the basis of assumed life of 10 years, plus a 5 percent real annual interest rate, was used to calculate the cost of other capital.

Total capital cost per ELCO varies dramatically, from only Rp. 18 per ELCO in Tangerang to over Rp. 140 in Kulon Progo (table 7.6, figure 7.2). This reflects the low public sector medical infrastructure per ELCO in Tangerang and the high infrastructure in Kulon Progo (see chapter 5). Medical equipment is the largest item of capital, accounting for about half of the total capital cost allocated to family planning.

Equipment makes up for the lion's share, between 40 and 50 percent, of capital costs (table 7.6). Interestingly, in Tangerang building costs, belonging to the community and servicing VDCs and Posyandu, contribute highly to cost of capital services in this region.

Health centers generally have the highest capital cost, ranging from 41 percent in Bantul to 91 percent in Barito Kuala, with an overall average of 67 percent (table 7.7, figure 7.3). Distribution of the remaining costs show great variability.

VDCs, which account for 55 percent of capital cost in Tangerang and 43 percent of capital cost in South Kalimantan, are responsible only for 10 percent and 12 percent of capital cost in Kulon Progo and Bantul, respectively. While the remaining facilities constitute only 5 percent of Tangerang's total costs, they constitute 42 percent of Kulon Progo's costs. Health sub-centers

consume between one-fifth to one-quarter of Kulon Progo's and Banjar's total costs, but elsewhere no more than 10 percent. Mother and child health facilities, which appear only in DI Yogyakarta, account for almost 40 percent of Bantul's costs and 15 percent of Kulon Progo's. Finally, the posyandu are not a major contributor to family planning capital cost; at their highest, posyandus make up only 8 percent of Kulon Progo's total family planning capital cost. Notably, capital cost is high also in South Kalimantan, although the pill is the most common method there.

Figure 7.2: Capital Costs per ELCO, by Capital Type

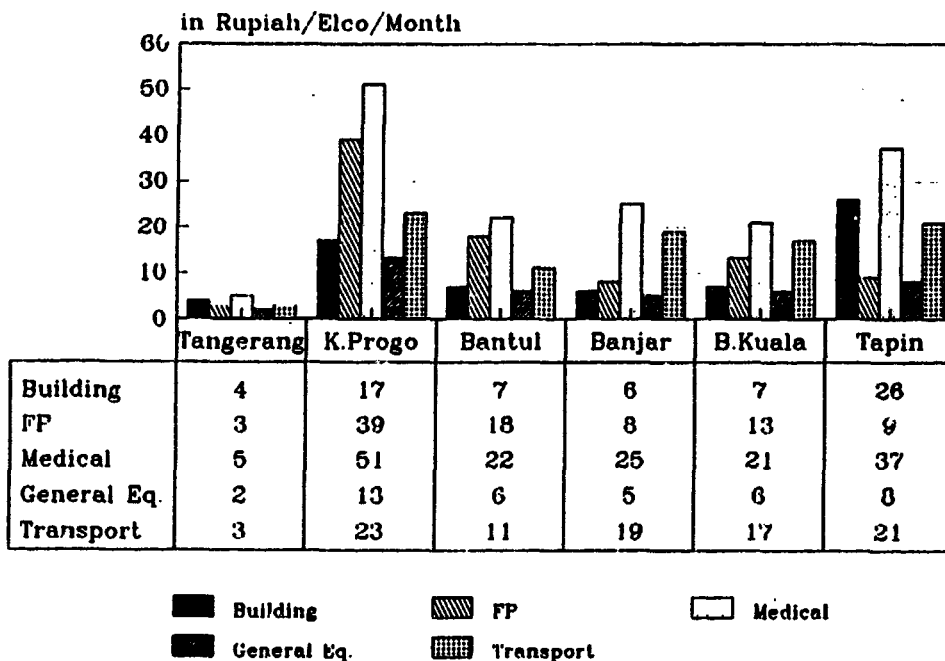
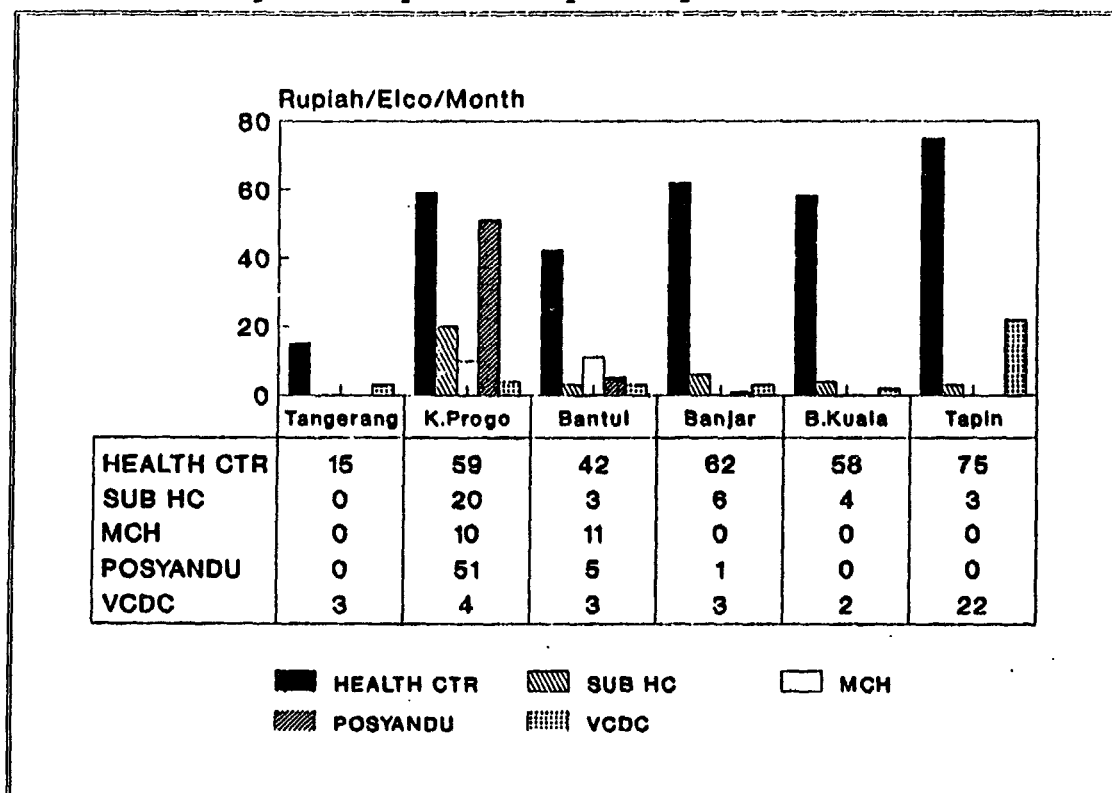


Figure 7.3: Capital Costs by Facility

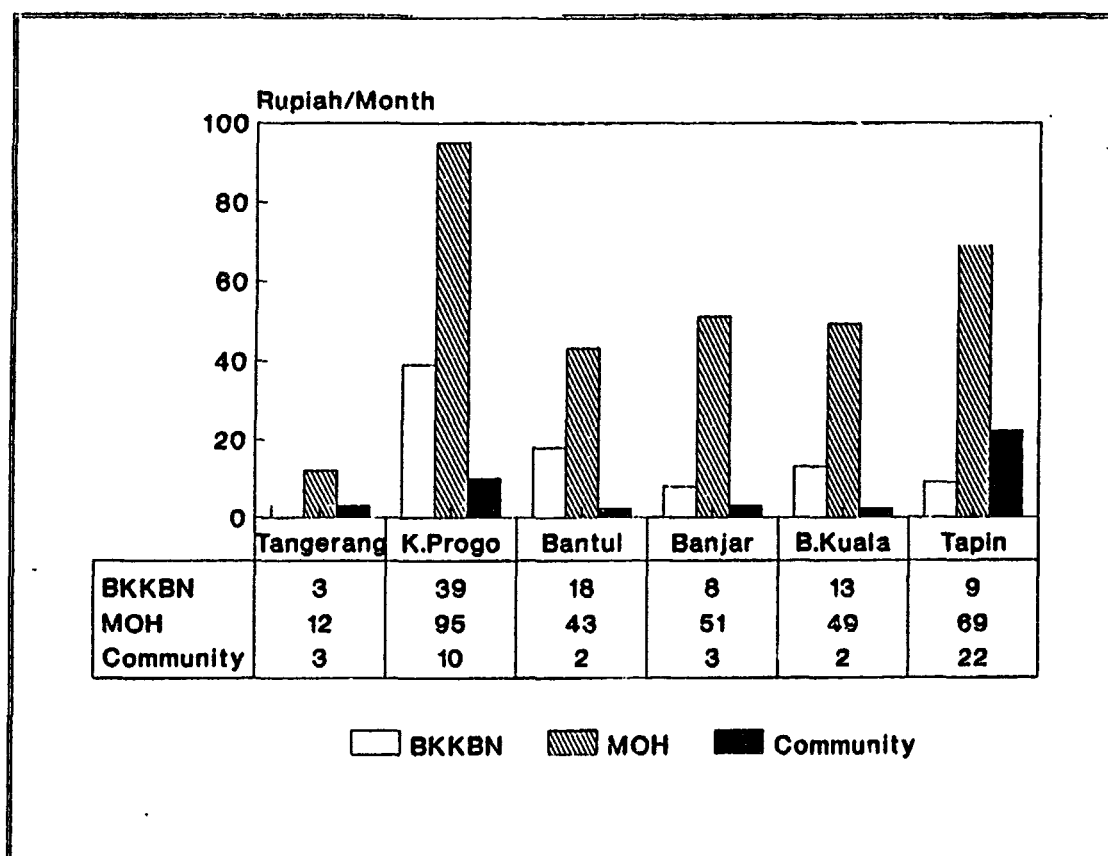


Capital cost is clearly associated with health facilities. Consequently, the MOH shoulders most of this cost (67 percent) through the provision of facilities and equipment (table 7.8, figure 7.4). As in the case of labor, BKKB's contribution to capital cost (largely in relation to IUD kits) is closely correlated with total capital cost.

Table 7.8: Capital Costs by Source of Funding  
in Rupiah per ELCO per month

	Tang.	Kulon Progo	Ban- tul	Ban- jar	Barito Kuala	Tapin	Mean	Distri- bution
MOH	67%	66%	68%	82%	77%	69%	53.2	69.00%
BKKBN	17%	27%	29%	13%	20%	9%	15.0	19.47%
Community	17%	7%	3%	5%	3%	22%	7.0	9.09%
Total	100%	100%	100%	100%	100%	100%	75.2	97.56%
	(18)	(144)	(63)	(62)	(64)	(100)		

Figure 7.4: Capital Costs per ELCO, by Source of Funding



#### 7.4. Costs of Contraceptives and Other Supplies and Utilities

Contraceptive supplies and purchased services, such as utilities, etc., are most closely associated with levels and composition of contraceptive delivery.<sup>17</sup> Hence, they are the most significant variable and marginal cost component. They are also the direct responsibility of BKKBN.<sup>18</sup>

VCDCs, which distribute pills and condoms, account for the bulk of the overall mean supply costs (tables 7.9, 7.10), reflecting the relatively recurrent nature of the supply costs with these two methods. The clear exception is Tangerang, where injectables are the primary method.<sup>19</sup> Injectables cannot be distributed through VCDCs, and consequently are distributed instead through the posyandus and health clinics. Costs of supplies in medical facilities are relatively low in Yogyakarta, where they deliver mostly IUDs, and relatively high in Tangerang and South Kalimantan, where they deliver pills and injectables.

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<sup>17</sup> Utility expenses for health and family planning facilities (including electricity, water, and other expenses) are negligible compared with other costs in the analysis. These expenses are not presented here.

<sup>18</sup> Contraceptive supplies are a major form of foreign donor assistance to the Indonesian program. This notwithstanding, supply costs are accounted for here. This is important for assessing strategies which may need to be considered, from an efficiency perspective, as future supplies may not be free.

<sup>19</sup> In Tangerang 5% of the injectables are distributed by private MDs and midwives, and condoms are also sold by pharmacies. These data are included in Table 7.9 but not in 7.10.

Table 7.9: Disposable Costs by Type of Contraceptive, Price in Rupiah per ELOO per month

	Unit Price	Tang.	Kulon Progo	Bantul	Banjarnegara	Barito Kuala	Tapin	Mean	Distribution
IUD	225	0%	2%	1%	0%	0%	0%	0.9	0.51%
Pill	315	30%	30%	52%	89%	93%	93%	120.6	67.65%
Condom	762	1%	63%	42%	3%	1%	2%	27.7	15.52%
Injectable	920	69%	5%	5%	8%	6%	5%	29.1	16.32%
Total disp		100% (177)	100% (118)	100% (183)	100% (195)	100% (229)	100% (167)	178.3	100.00%

Table 7.10: Cost of Disposables, by Mode of Delivery in Rupiah per ELOO per month

Facility	Tang.	Kulon Progo	Bantul	Banjarnegara	Barito Kuala	Tapin	Mean	Distribution
HC	30%	6%	6%	23%	15%	12%	27.1	15.47%
Sub HC	0%	3%	1%	1%	3%	1%	2.8	1.58%
MCH	0%	1%	3%	0%	0%	0%	0.9	0.53%
Posyandu	43%	1%	3%	6%	7%	8%	19.9	11.37%
VDC	28%	90%	87%	70%	75%	79%	124.7	71.05%
Total	100% (167)	100% (118)	100% (180)	100% (192)	100% (229)	100% (166)	175.5	100.00%

#### 7.5. Total Cost of Resources and Sources of Funding

Tangerang's resource cost is lowest, and Tapin's highest (table 7.11, figure 7.5). Supplies constitute a large proportion of expenditures in Tangerang, while labor costs are relatively high in the other areas, notably in Tapin because of the involvement of medical personnel.

The data presented in table 7.12 and figure 7.6. separate these same costs by the providers of the different resources: BKKBN, the Ministry of health, and the community. Community cost figures reflect computed salaries for volunteers, and the space and equipment used by posyandu and VCDC facilities. Most remarkable is the uneven distribution of Ministry of Health resource, from Rp. 32 per eligible couple per month in Tangerang to Rp. 226 in Tapin. This reflects medical service distribution patterns per capita. In view of these variations, it is most interesting that the contribution of BKKBN is relatively even, ranging from Rp. 226 in Tangerang to Rp. 376 in B. Kuala. It follows that BKKBN pursues a fairly uniform rule of resource allocation, in spite of different regional leverages. This in part reflects the relatively even allocation of its PLKBs (see chapter 6), and the evidence that where supply costs are high, as in Tangerang, its labor and capital costs are low because of BKKBN lower reliance on medical staff and facilities.

The ratio between the total spending on family planning and each rupiah spent by BKKBN, can indicate the agency's relative effectiveness in mobilizing and coordinating resources (table 7.13). The ratio is lowest in Tangerang and highest in Kulon Progo and Tapin, where medical infrastructure is highest per



ELCO and v<sup>+</sup> are there is less need for supplies.

Table 7.11: Monthly Total Program Costs  
in Rupiah per Elco per Month

	Tang.	Kulon Progo	Ban- tul	Ban- jar	Barito Kuala	Tapin	Mean <sup>a</sup>	Distri- bution
Labor	27%	44%	39%	44%	44%	57%	204.3	44.67%
Capital	7%	31%	16%	13%	12%	16%	85.0	16.38%
Disposables	66%	25%	45%	43%	44%	27%	178.2	38.95%
Total	100%	100%	100%	100%	100%	100%	457.4	100.00%
	(267)	(464)	(406)	(455)	(524)	(629)		

Figure 7.5: Total Program Cost

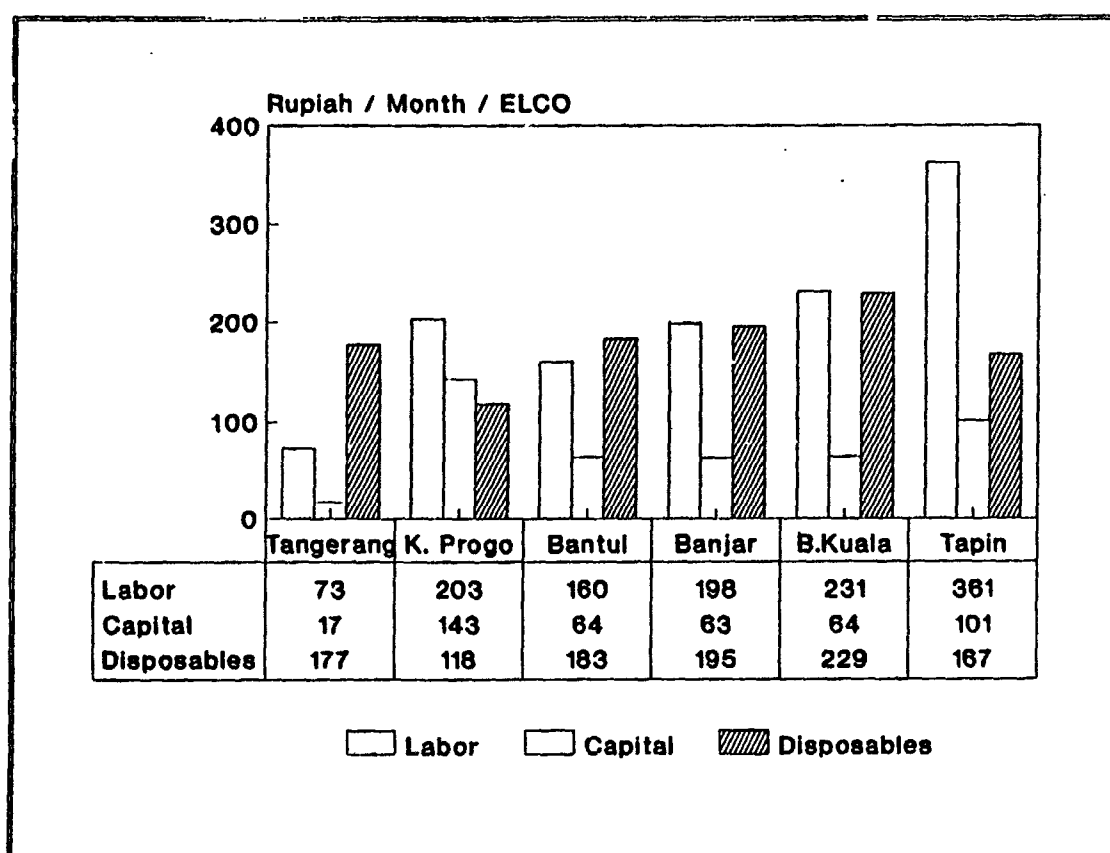


Table 7.12: Monthly Total Costs, by Source of Funding  
in Rupiah per Elco per month

	Tang.	Kulon Progo	Ban- tul	Ban- jar	Barito Kuala	Tapin	Mean	Distri- bution
BKBN	85%	54%	70%	62%	72%	54%	293.2	64.20%
MOH	12%	35%	23%	33%	24%	36%	130.7	28.61%
Community	3%	11%	7%	6%	4%	10%	32.8	7.19%
Total (Rp.)	100% (267)	100% (463)	100% (405)	100% (454)	100% (523)	100% (628)	456.7	100.00%

Figure 7.6: Monthly Total Costs, by Source of Funding

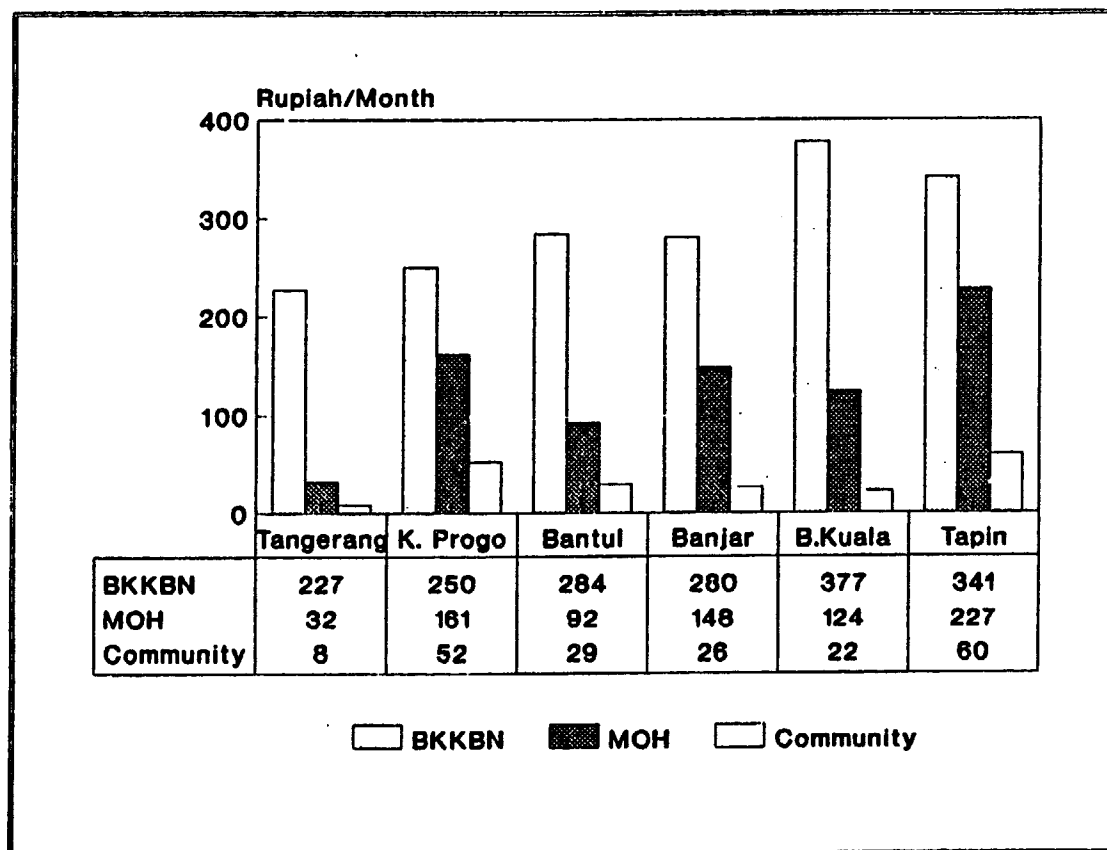


Table 7.13: Ratio of Total Cost to BKKBN's Cost by Regency

Tang.	K.Progo	Bantul	Banjar	B.Kuala	Tapin
1.18	1.85	1.43	1.62	1.39	1.84

#### 7.6. Summary

The value of resources allocated to family planning delivery ranges from about 270 Rps. per month per ELCO in densely populated Tangerang to 630 Rps. in sparsely populated South Kalimantan. BKKBN manages to mobilize from other government agencies and the community, an additional 1 Rupiah for each Rupiah it invests in its field operations. The ratio would fall, of course, if BKKBN's administrative overhead costs were included. These figures reflect the finding that, on the whole, BKKBN bears about 50% of family planning delivery costs, the Ministry of Health 40%, and the community the remaining 10%. BKKBN does especially better in areas where there is a medical infrastructure because it does not pay full labor value for medical personnel and can rely on longer lasting and less costly methods, notably the IUD, especially relatively lower resupply costs.

It is noteworthy, that physicians and other medical staff receive only 8 percent of their government income from BKKBN, even though they report spending roughly 20 percent of their time on family planning activities (chapter 6). The marginal cost to BKKBN of the time that these staff allocate to family

planning is thus lower than the total value of said time.<sup>20</sup> Moreover, in performing family planning activities, the medical staff use buildings and equipment which are part of the medical infrastructure. Due to the relative scarcity of trained medical personnel and facilities in Indonesia, these inputs should not be viewed as free. The opportunity or social cost of this activity by medical staff to Indonesian society, therefore, has been treated here as the sum of both MOH and BKKBN salary and capital cost, a cost clearly higher than what BKKBN itself pays.<sup>21</sup>

The data on labor cost and its funding, combined with the data about BKKBN staff allocations discussed in the previous chapter, are indicative of the allocation issue confronting the agency. On the one hand, it must respond to some perception of need, as manifested by the size of the target population and a lack of the resources that could provide family planning. On the other hand, it must respond to productivity considerations which are high where resources to coordinate are high - that is, where there is medical and community infrastructure.

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<sup>20</sup> The private incentives for time allocation in this setting do not automatically induce medical personnel to allocate their time in a 'socially' optimal manner; the private opportunity cost of reallocating time between family planning and medical activities is essentially zero for medical personnel whose regular working hours are fixed by the government. Therefore, small honoraria which BKKBN pays for medical personnel activities during their regular working hours may have large impacts on time allocation decisions.

<sup>21</sup> It is beyond the scope of this discussion to assess the shadow price or opportunity cost of medical personnel engaging in family planning. This would entail assessing the "sacrifice" in medical services because of family planning activity. It should also be emphasized, however, that family planning has a clear impact on health.

## 8. PROGRAM COST-EFFECTIVENESS

### 8.1. Introduction

The cost to serve a user (C/U) is a measure of program cost effectiveness. It is the ratio between prevalence rate (U/E), discussed in chapter 4, and the value of resources allocated per ELCO (C/E), summarized in the previous chapter. That is, unit user cost reflects both resource productivity as measured by prevalence rate, and resource allocation in a target population as measured by cost per ELCO.

The objective in this chapter is to examine the level and structure of user cost, and to start exploring how it correlates with scale of operation, types of inputs, method mix, productivity of inputs, and some aspects of consumer demand as outlined in chapter 3. Thereby we should identify the delivery strategies and means that can increase the cost-effectiveness of the program, and the institutions who control various aspects of such strategies and means.

It is important to stress that long term cost is discussed here: the cost of providing protection to a group of users in a given population in a steady state marked by uniform flows of new users and dropouts vis a vis the size of the group and method mix.<sup>22</sup> One would ideally wish to compare different

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<sup>22</sup> For an elaboration on this and other conceptual issues, see Chernichovsky, (1990).

programs but of the same age and where method switching does not take place. New and growing programs tend to have (especially when delivering IUD and sterilization) high initiation cost. And, for the same reason user cost tends to be high where method switching to more permanent methods takes place. That is, programs which have more new users of any kind, tend to be more expensive in the short term than the same programs when stable. This issue will be considered throughout the discussion.

## 8.2. Program Cost Per User

It is costliest - about Rps. 900 per month - to serve the average user in South Kalimantan (table 8.1).<sup>23</sup>

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<sup>23</sup> The reader is reminded that the user cost is the cost of serving a user in the population. This definition is not as much of an issue in the case of pill users as it might be in the case of IUD users. For the pill, the entire group of users is serviced unremittingly, and there is almost an identity between the group of users and the group serviced during any particular period. For the IUD, just new acceptors and those who need replacement are actually treated by the program during, say, the year. The cost of an IUD insertion would clearly be higher than the cost of the average IUD user. The discussion here concerns the long term recurrent cost of protecting a group by two alternative methods. This comparison is particularly valid here because the IUD-based program, in Yogyakarta, is the oldest, about 25 years and has no new users (see Table 4.5). Consequently, the program does not incur initiation cost. If we assume that on the average every user replaces her IUD very 3 years, then a 1/3 of the women are treated by the program every year, and treatment cost is three times as much as user cost.

Table 8.1: Program Cost per User by Type of Cost, in Rupiah per month

	<u>W. Java</u> Tangerang	<u>D I Yogya</u> Kulon Progo    Bantul		<u>S.Kalim.</u> Banjar    Barito    Tapin			Mean (1000 Rp)	Distri- bution
Labor	27%	44%	39%	44%	44%	57%	314.0	44.58%
Capital	7%	31%	16%	13%	12%	16%	109.9	15.61%
Supplies	66%	25%	45%	43%	44%	27%	280.4	39.81%
Total	100% (452)	100% (559)	100% (539)	100% (819)	100% (890)	100% (970)	704.3	100.00%

This region has the youngest program, relatively low population density and ELCO's per resources, and a method mix almost wholly composed of the pill, which is delivered largely by medical facilities. It costs about half the above figure to maintain a user in Tangerang, where population density is highest and resources per ELCO is lowest, and where the most popular method delivered to the community is the injectable. The cost per user in Yogyakarta is in between these two extremes.

The breakdown of user cost by type of cost shows that the share of capital cost is lowest in Tangerang where the target population is largest in relation to medical infrastructure. Capital cost shares are highest in Yogyakarta, which has a heavier medical infrastructure per ELCO than the other areas (table 8.1).<sup>24</sup>

<sup>24</sup> In the discussion which follows we combine Kulon Progo and Bantul to "Yogyakarta" and the three South Kalimantan areas to "S. Kalimantan".



Labor cost follows a similar pattern. This appears to reflect the allocation of labor per ELCO and the quasi-fixed nature of labor cost.

Cost of supplies ranges from 37 percent of user cost in Yogyakarta to 66 percent in Tangerang (table 8.1). They are highest in absolute terms in South Kalimantan where the pill is most common, and lowest in Yogyakarta, where the IUD is most prevalent.

Cost of supplies are of special significance because of their variable and recurrent nature, and the way they figure in public budgets. From a substantive viewpoint, programmatic changes that alter cost of supplies, for given groups of users and level of protection, determine the economic rates of return to such changes, and thereby the overall cost effectiveness of a delivery strategy as characterized by method mix. That is, a strategy based on pills, for example, requires a different investment in the delivery setup and the initiation of the group than a strategy based on IUD. The recurrent cost of the two strategies will be different too. Strategies are considered, from the providers perspective, alternatives, when there is a trade-off between level of investment and subsequent recurrent cost. This raises the need to deal with the rate of return to a required investment, say for replacing the pill by IUD. This return is determined by the recurrent cost savings (of servicing the population with IUD) vis a vis an ongoing alternative (servicing with the pill).

From an institutional and budgetary viewpoint, unlike fixed cost,

variable cost show in recurrent budgets, and of all variable cost components, supply cost are less subject to political and institutional considerations such as the case may be for labor cost.<sup>25</sup> Hence, there may be scope to alter them, if the required investment can be made.

### 8.3 The Effect of Scale of Operations

The user cost data just presented, reflect many programmatic aspects related to program efficiency: scale of operations, resource productivity, method mix cum delivery system, and consumer demand, all of which determine the cost-effectiveness of one operation when compared with the other. Indeed, these data conceal basic information about the underlying causes for the user of the different types of programs.

We start with the study of the effect of scale of operation. To this end, unit user costs of different programs are compared for similar levels of output. It has been already established above that larger operation per worker tend to be less expensive, but without adjustment for other factors. The point estimates (table 8.2) indicate that to the extent that there are common levels of output or users, in the range of 2,000-5,000 users per subdistrict, South Kalimantan is still the costliest area and Yogyakarta the least costly.

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<sup>25</sup> In Indonesia, maintaining employment is a clear policy objective of the government. At the same time the government wishes to contain the growth of civil service. Such policies may override efficiency considerations with regard to personnel.

Table 8.2: Unit User Cost by Region for Similar Output Levels

Region	Output range	Mean no. of users	No. of subdistricts	Average user cost
Tangerang	3,703-5,125	4,457	4	647 Rps.
Yogyakarta	2,086-5,158	3,380	38	526 "
S. Kalim.	2,252-5,156	2,898	11	837 "

These findings are corroborated by the data illustrated in figure 8.1, based on predicted values from linear regression estimates within the similar output ranges. Yogyakarta is still the least expensive within the entire range. In the output range above 4,000 users, South Kalimantan tends to become less costly than Tangerang. These data also support the hypothesis that larger operations of field workers in any program type are associated with lower user cost.

Clearly, the age of program or its growth rate are of relevance here. The program in S. Kalimantan is the youngest and the fastest growing of the programs and is therefore expected a priori to be the most expensive, *ceteris paribus*. This is, however, not as much of an issue here primarily because the older program, in Yogyakarta, is based on the IUD which would incur the highest initial cost. The youngest program in S. Kalimantan, is based on the pill which incurs comparatively low initiation cost. Still, Yogyakarta has no new users while S. Kalimantan has most (table 4.5), and under more

long term and stable conditions it might be less expensive. In addition, the discussion of scale of operations is adjusting somewhat for potential initiation cost. As field workers are allocated on the basis of ELOCs, workers with larger numbers of users (given number of ELOCs), are likely to have fewer new users. Hence, one of the reasons larger operations, as defined here, are less expensive is because they have fewer new users.

#### 8.4. Marginal and Average Variable User Cost

Both marginal cost -- the cost of servicing an additional user -- and related average variable cost, comprise cost of supplies (SUP) and those labor costs which vary with output.<sup>26</sup> Consequently, this type of cost is less influenced by level of operations (across field workers) than average user cost discussed thus far. As cost of supplies is constant per user, marginal cost would rise (and influence average variable cost to rise as well), only if the marginal productivity of labor is falling when workers need to service a larger population.<sup>27</sup>

Data were available on cost of supplies, but not on the variable elements of labor cost.<sup>28</sup> To establish the marginal cost associated with labor, we estimated this relationship:

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<sup>26</sup> "Cost of Supplies " is per the discussion in Chapter 7.

<sup>27</sup> The high initiation cost in S. Kalimantan would be measured here in labor cost, mainly MDs time required to subscribe pills to new users.

<sup>28</sup> These labor cost elements would include honoraria, travel, etc. that tend to vary with output. Although this information was available in principle, its association with number of users was not clear.

$$\text{total labor cost} = a + (b \times \text{users})$$

where "a" is the fixed element of labor cost and "b" its variable element. Consequently, the marginal cost per user in each region are (SUP + b). Accordingly, marginal costs per user were obtained (table 8.3).<sup>29</sup>

Table 8.3: Marginal Costs per User (all cost included)

	Supplies per user	Estimated variable labor costs	Estimated Marginal costs
Tangerang	298	44	342
Yogyakarta	204	92	296
South Kalimantan	346	166	512

<sup>29</sup> Actual Estimates are (y = no. of users):

Tangerang Total Labor Cost =  $649 + 0.044y$ ; Adj.  $R^2 = .22$   
(in Rps. 1000) (4.36) (2.58) N = 21

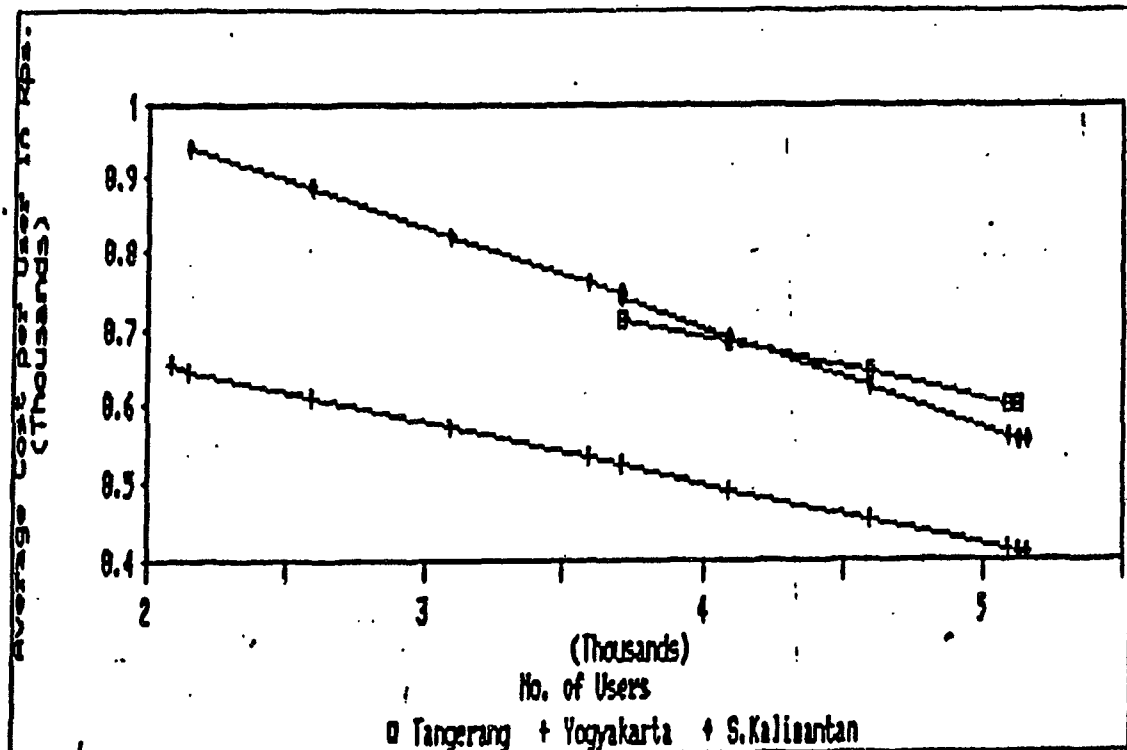
Yogyakarta Total Labor Cost =  $406 + 0.917y$ ; Adj.  $R^2 = .23$   
(3.83) (3.04) N = 29

South  
Kalimantan Total Labor Cost =  $431 + 1.66y$ ; Adj.  $R^2 = .41$   
(6.06) (4.80) N = 33

Here again, servicing an additional user is least costly in the Yogyakarta areas primarily because of their relative dependence on the IUD which has the lowest supply costs per average user. It is most costly in South Kalimantan because of high dependence on the pill supplied through medical infrastructure and personnel, in part because of the young age of the program.

A general comparison of marginal cost with average unit cost estimates suggests that marginal cost tends to be lower than average cost in South Kalimantan, and in Yogyakarta in particular. This is usually an indication of "too" small operations where economies of scale -- vis a vis labor inputs -- are not fully exploited with regard to the quasi-fixed labor costs. Namely, the same workers could do more, or the same work could be done, on the average, with fewer workers.

Figure 8.1: Predicted Average Costs per User



### 8.5. Adjustment of User Cost for Alternative Prevalence Estimates

It was noted in chapter 4 that the BKKBN program statistics used in this study deviate from the Intercensal Survey (ICS) and the Demographic and Health Survey (DHS). The differences between the data sources are basically in scale and not in method mix.

Table 8.4: Ratios of Prevalence Rates from Surveys to BKKBN Annual Reports

	Intercensal Survey	DH Survey
West Java (Tangerang)	0.77	0.76
DI Yogyakarta (Yogyakarta)	0.74	0.92
South Kalimantan	0.61	N/A

Source: table 4.2

As the prevalence rate affects user cost, an adjustment is made in user cost estimates according to the scale coefficients shown in table 8.4. Since user rates from the surveys are lower than those from BKKBN statistics, user cost is inflated (table 8.5) accordingly. This adjustment shows that the ordering of average user costs by region, does not change, except for an equalization of the cost of Tangerang and Yogyakarta.

Adjustment of marginal cost estimates are shown in table 8.6. This



adjustment is more significant than the previous one because cost is less affected by scale of operation than user cost. Here again, while the ratios between the original estimates change, their ordering does not. If anything, the adjustment amplifies difference between the areas, suggesting that the Yogyakarta marginal cost per user relative to the other areas is even lower than estimated originally.<sup>30</sup>

Table 8.5: Adjustment of User Costs per Alternative Prevalence Rate Estimate  
(Ratio: Tangerang = 1.00)

Study area	Original cost	Adjustment per ICS	Adjustment per DHS
Tangerang	455 (1.00)	591 (1.00)	598 (1.00)
Yogyakarta	547 (1.20)	739 (1.25)	592 (0.99)
South Kalimantan	866 (1.90)	1,419 (2.40)	N/A

Table 8.6: Adjustment of Marginal Cost per Alternative Prevalence  
(Ratio: Tangerang = 1.00)

Study area	Original estimate	ICS	DHS
Tangerang	342 (1.00)	444 (1.00)	450 (1.00)
Yogyakarta	296 (0.87)	400 (0.90)	321 (0.71)
South Kalimantan	512 (1.50)	839 (1.90)	N/A

<sup>30</sup> It should be noted that these differences might be even larger as wastage is more likely where the pill is most common, in South Kalimantan, and least likely where the IUD is most common, in Yogyakarta.

### 8.7. Summary

In this chapter, data on prevalence and resource allocation were combined to estimate the long term cost of servicing a user in each of the study areas. It is costliest (900 Rps. per month) to maintain a user in South Kalimantan. It is half of that cost in Tangerang, the least costly area. In all regions, especially South Kalimantan and Yogyakarta, scale of operations is an important variable influencing user cost: larger (field worker) operations are less costly. When scale of operation is controlled for and variable and marginal user costs are examined, Yogyakarta has the least costly type of program from a long term perspective.

There is a clear indication in the data of a negative association between cost of supplies per user and the permanence of the most common method in use. It is also clear that the IUD and to a lesser extent the injectable require medical attention. Hence, user cost to BKKBN is almost entirely influenced by method mix that, in turn, is to a substantial degree set by availability of medical infrastructure, personnel, and consumer demand. Over those, which are rather intimately interrelated, BKKBN has no control.

BKKBN controls its labor cost, which represents one-fifth of total recurrent cost of field operations, and about one-third of its own cost in those operations. This means that the agency in charge of the program

appears to have rather limited latitude in terms of controlling its own costs, let alone the cost of the entire program, under current family planning technology.

The next chapter concerns the question of how EKKBN might improve the cost-effectiveness of its own operations.

## 9. WORKER PRODUCTIVITY AND EFFICIENCY OF FIELD OPERATIONS

### 9.1. Introduction

The prime resources BKKBN can control are its staff of field workers (PLKB) and supervisors (PPLKB). How BKKBN recruits and allocates them determines the effectiveness and the cost-effectiveness of its individual operations. It has been established (chapter 6) that BKKBN allocates its field workers largely on the basis of number of ELCOs, and to a lesser extent on the basis of number of villages. Supervisors are assigned on an administrative basis.

The objective in this chapter is to examine these allocation strategies for their cost-effectiveness, and whether BKKBN could improve the cost-effectiveness of its field operations through better staff recruitment and allocation strategies.

### 9.2. Field Worker and Supervisor Productivity: A Model and Hypotheses

The resources available to field workers and supervisors are their own time and the community resources they can mobilize: volunteers, distribution points operated by volunteers (VDCs), and medical resources. Let us assume that the average field worker's potential production in the community ( $U_S$ ) is a function of time spent in delivery and coordination ( $t_d$ ) and of infrastructure ( $I$ ) available to him:

$$U_S = f(t_d, I).^{31} \quad (9.1)$$

This is a technological relationship representing a worker's potential in the community: the number of users he or she can service with different amounts of time allocated to delivery, given a particular method mix and community resources.<sup>32</sup> This function is depicted by curve  $f()$  in the upper right quadrant of figure 9.1. It is further assumed that all workers share the same production function or technology, that each strives to maximize output, and that the maximum can be reached by exhausting all working time.<sup>33</sup>

Clearly, the greater the output, the lower the unit cost per user. A worker is considered a "quasi-fixed" input and the marginal cost of his or her operation entails primarily costs of supplies and possibly some honoraria and travel costs (chapter 7).<sup>34</sup> Optimal output and minimal unit cost would be

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<sup>31</sup> For clarity of discussion, the number of variables in this and the functions which follow in this section, is kept to a minimum, without loss of generality.

<sup>32</sup> As resource mobilization enhances the worker's productivity by providing more help in the community, the function  $f()$  may be viewed as the function expressing optimal solutions for allocation of time between delivery and resource mobilization. It is further assumed that workers wish to deliver the most efficacious method mix. They are constrained, however, by availability of medical infrastructure and consumer demand levels.

<sup>33</sup> These assumptions, the last in particular, are kept to maintain clarity of discussion.

<sup>34</sup> The worker's wage is a fixed cost because he or she neither works nor is paid on a part-time basis. It is noteworthy that the marginal costs to society are larger than the marginal cost to BKKBN if other community resources are indeed diverted to family planning.

achieved at output level  $U_{sm}$ .<sup>35</sup>

Let us further assume that demand, delineated by number of would-be users ( $U_d$ ) in an individual worker's catchment area, is a function of number of ELOCs ( $E$ ), their socioeconomic characteristics ( $SE$ ) and promotion efforts, - - field worker time allocated to promotion ( $t_p$ ), or IEC activity, and consumer incentives ( $CI$ ):

$$U_d = g(E, SE, t_p, CI) \quad (9.2)$$

This function is delineated in the lower left quadrant of figure 9.1. Clearly, the number of would-be users cannot exceed the number of ELOCs in any catchment area ( $U_d \leq E$ ): the upper limit of demand is  $E$ . Its lower limit is  $U_{dl}$ , or the level of latent demand that may be influenced by consumer incentives in the area, when  $t_p = 0$ . To the extent that  $g()$  is indeed a function of  $t_p$ , it forms another production function representing a worker's ability to mobilize new acceptors and retain users in a given catchment area. The marginal ability to do so must be falling because of the upper limit set by numbers of ELOCs.<sup>36</sup> As in the case of function  $f()$ , it is assumed that all workers share the same function.

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<sup>35</sup> The underlying assumption is that while an individual worker cannot be hired on a part-time basis, workers can be hired and dismissed, and their catchment areas reallocated so that those remaining on the job would produce at point  $U_{sm}$ .

<sup>36</sup> Consumer incentives may raise this function, but "flatten" it as well. That is, worker productivity in promotion may fall even faster when such incentives are increased.

Worker productivity can mean both more effective supply efforts, shifting  $f()$ , and more effective promotion efforts, shifting  $g()$ , per unit of time invested in any activity. Particular personal characteristics may be more useful in supply efforts and others in promotion efforts. A more productive worker can deliver more with given resources or meet the same demand levels with fewer resources.

As under full employment conditions,

$$t_d + t_p = T, \quad (9.3)$$

where  $T$  is total working time available to a worker, there is a trade-off between the two activities. This trade-off is depicted by the  $45^\circ$  (negatively slopping) line in the lower right quadrant of figure 9.1. The  $45^\circ$  line in the upper left quadrant represents all points where supply equals demand.

Two fundamental regimes can be identified in this model. The first is depicted in figure 9.1 by  $g(E_3)$ . In this case the worker cannot satisfy latent demand. Promotion activities would be wasteful for as long as  $U_{d1} > U_{sm}$ . Staff works to capacity and unit costs are minimal, but demand is not fully exploited. This situation should be indicative of a program which does not have enough resources to procure sufficient workers and supplies to service the demand in its target population.

The second regime is depicted by  $g(E_0)$  or  $g(E_2)$ , situations where the worker's maximum capacity to serve exceeds the population's latent demand,

$U_{dl} < U_{sm}$ . In this case the worker has more time than needed to satisfy latent demand for services, and therefore can allocate time to demand promotion. This situation should be indicative of a program which can afford to hire more workers than needed to satisfy latent demand. Therefore, the program should promote demand. This can be done through consumer incentives to clients, or by reducing the target populations assigned to each worker so that there is time for delivery, as well as promotion.

The optimal situation under the second regime would be the singular supply and demand situation,  $g(E^0)$ , leading to point  $O^0$ , where a worker is assigned to a population in which he or she can allocate all working time in a way that leads to  $U_d^0 = U_s^0$ , and workers allocate their entire time productively, or are fully employed,  $t_d^0 + t_p^0 = T$ .

Two non-equilibrium situations may prevail. The first is portrayed by point  $O'$ , associated with function  $g(E_1)$  and excessively low demand. A worker produces more than is demanded. This is wasteful: more resources are allocated to delivery than used, and user cost can be reduced. The worker should increase promotion efforts at the expense of delivery efforts, until reaching equilibrium or close to it. The second situation is delineated by point  $O''$ , associated with function  $g(E_2)$ , and excessively low supply. This is not wasteful in terms of program resources; it is socially wasteful in terms of the client's queuing time. The worker may fine-tune time allocation, more time allocated to delivery and less to promotion, keeping fully employed and minimizing the social cost entailed in queuing.



Given the worker's productivity potential, delineated by  $f(\cdot)$ , there may be only one demand function  $g(E^0, \cdot)$  which makes possible a full equilibrium such as depicted by  $O^0$ . The issue is that the worker's marginal promotion efforts may not "match" their marginal delivery efforts. For example, in a given range of operations there is excess supply. A worker may decide to reduce delivery efforts by one hour and increase promotion efforts by the same amount of time. The two outcomes may not match; he or she may generate less or more demand than the reduction in supply. If workers are assigned relatively low numbers of ELOCs, their marginal productivity in promotion may begin declining at relatively low levels of time allocation to promotion, and it may fall fast. The likelihood of excess supply is greater in such situations. Consumer incentives may aggravate the situation in this case. This might manifest itself in staff underemployment and waste of other resources.<sup>37</sup>

When pills are required to satisfy consumer demand, worker production potential might be high, as he or she are not constrained, in a relative sense, by infrastructure. Consequently, redundancy of supply (efforts and supplies) is more likely than in the case of, say IUDs, where supply may be constrained by medical facilities and staff. This hypothesis is supported by the evidence suggesting (see chapter 4) that when comparing service statistics and survey data, discrepancies are most likely to exist in the case of pills than of other methods.

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<sup>37</sup> If a worker does not actually sit idle, the social waste of community resources which the worker mobilizes may be higher than the waste of just BKKEN resources.

It should be further noted that circumstances of excess supply mean a waste for BKKBN, which is paying the worker and for stocking of supplies in any case. There may be savings to the government nonetheless, or society-at-large, if the efficient worker saves on health and other community resources.<sup>38</sup> Only under demand situations  $g(E > E_0)$  indicating likely queuing, a more productive worker would produce more and benefit the entire system at the expense of queuing time of the population.

Two basic allocation problems are presented here. The first is the allocation of population cum environment to an individual worker. This allocation decision must be taken by program management, at least at the supervisor's level. The second is the worker's time allocation. This is most likely to be the worker's own decision which might be influenced by guidelines and his or her supervisor.

It must be recognized that in any of the situations discussed above, workers may misallocate their time: too much in delivery and too little in promotion, or vice versa. The same may be said about promotion incentives.<sup>39</sup> They would be useful when a lack of effective demand is not an obstacle to higher worker productivity and when the number of ELCOs per worker is not

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<sup>38</sup> This exemplifies a situation where BKKBN's incentive to save is lower than what the government's or society's would be, as the agency would not benefit directly from such savings.

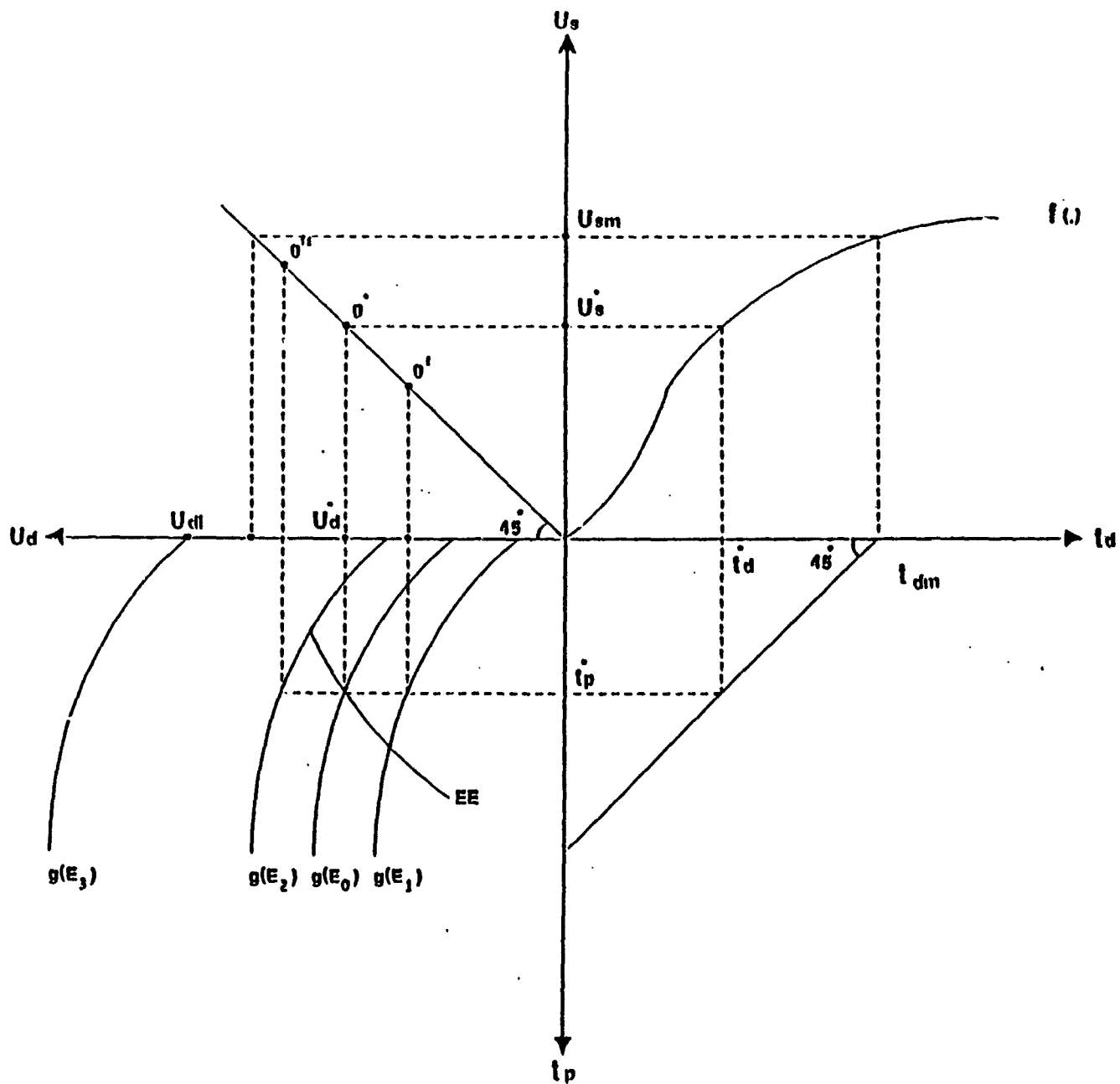
<sup>39</sup> This is part of the optimization process not dealt with explicitly here. For a formal discussion, see Chernichovsky (1990).

low enough that even with incentives the worker remains underemployed, and incentives just reduce his or her marginal productivity in promotion.<sup>40</sup>

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<sup>40</sup> In the long run, there may be a trade-off between incentives and time allocation to promotion, or IEC and the search for new acceptors. Workers are traded with incentives so that there is an optimal allocation between hiring workers and incentives.

Figure 9.1: Field Worker Productivity: Interaction between Supply and Demand in a Catchment Area



According to the model, the logical sequence of efficient resource allocation should be as follows:

- a) satisfy latent demand for as long as possible with available resources by hiring workers. Then, if resources are still available -
- b) hire more workers, reducing the catchment area per worker, and at the same time raise demand through incentives so that workers work to capacity in delivery. If resources are still available, -
- c) continue hiring workers, reducing further the catchment area per worker, and start promoting demand through IEC and related activity, while balancing time allocated to promotion and time allocated to delivery.<sup>41</sup>

The empirical analysis aims to test the hypotheses derived from this framework. These are:

- a) BKKEN's field workers are underutilized (situation O'), implying that:
  - . worker productivity is influenced by demand conditions: only more demand through a larger target population to the average worker, would generate higher productivity; and,
  - . productive workers would utilize fewer resources, including their own time (without cost savings to BKKEN).

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<sup>41</sup> There is an optimization problem concerning the optimal allocation of resources to promotive incentives to clients and to staff working in promotion or IEC. The principle guiding this discussion is that the situation is such that supply efforts lag behind demand to assure maximum productivity and least unit costs.

b) BKKBN's field staff work to capacity (situation 0" and above), implying that:

- . demand conditions do not affect worker productivity; and,
- . relatively productive workers would produce more, and produce at lower unit costs.

Each has different implications on how BKKBN might increase the efficiency of its operations.

### 9.3. Field Worker Productivity Estimates

The first task of the empirical analysis is to test under which regime BKKBN's field workers operate: one consistent with the first hypothesis, or another, consistent with the second.

Under the first, any changes in demand would be met by the workers. In this case the upward slope of the production function  $f()$  would be "traced" (across observations) by the data, without reaching maximum potential production within the relevant range. Under a regime consistent with the second hypothesis, upper levels of demand would not be met by the individual (average) worker, and the number of users would not increase beyond a certain number of ELCOs within the range of ELCOs observed in the data. Hence, the effect of the variables influencing effective demand are the clues to the answer of which regime BKKBN's average field worker operates under in the

study areas.

The statistical analysis therefore concerns the estimation of structural relationship 9.2 under the assumption that workers attempt to satisfy demand and that demand conditions determine productivity. It employs the variables listed in table 9.1 with reference to conceptual framework and operational category.

Table 9.1: List of Variables and Reference to Analytic Framework

<u>Variables</u>	<u>Conceptual framework reference</u>	<u>Operational reference</u>
U -No. of current users	$U_d$ and $U_s$	Output
<u>Scale of Operation and nature of Catchment area</u>		
E -No. of ELCOs	Size of target population - relationship (9.2)	Program design, targeting, and scale of operations
AE-Area in square hectares	Size of catchment area - relationship (9.2)	
VL-No. of villages in jurisdiction	Nature of catchment area - relationship (9.2)	
<u>Population Characteristics</u>		
CH-No. of children under age 5	Socioeconomic characteristics - relationship (9.2)	Targeting
<u>Worker Characteristics and Pay</u>		
AGE	Qualitative	Recruitment
SEX - (Male = 1, Female = 0)	Attributes of	and retention
MS - Married (yes = 1, No = 0)	$t_d$ and $t_p$ in	of workers
ED - Years of schooling	relationship (9.1)	
EX - Years of experience	and (9.2)	
Try - Weeks of training		
<u>Demand Promotion</u>		
CO-Availability of a coconut seedling scheme (yes=1, no=0)	CI in relationship (9.2)	Promotive incentives to consumers
CR-Availability of a credit scheme (yes=1, no=0)		
PU-Availability of public facilities (yes=1, no=0)		
IEC-Proportion of field worker's time allocated to IEC	$t_p$ in relationship (9.2)	Worker's time allocation



Table 9.1 (continued)

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<u>Worker Delivery and Coordination Activities</u>		
ORG-Proportion of field workers' time spent on such activities	$t_d$ in relationship (9.1)	Worker's time allocation
<u>Infrastructure</u>		
Md-No. of MDs in subdistricts	I in	Program design, and allocation of time to resource mobilization
VC-No. of VDCs in area	relationship (9.2)	
VO-No. of family planning volunteers		
PO-No. of integrated FP and health posts ( <u>posyandu</u> ) <sup>42</sup>		

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Several functional relationships are consistent with falling marginal productivity and with an upper level of productivity as depicted by function  $f()$  in figure 9.1. Of several such functions, the two providing the best estimates are reported here: the linear-quadratic, and the double and semi-logarithmic combination. Of these, the double-logarithmic (between users and ELOCs) does not subsume the number of ELOCs (per field worker) as the upper limit to worker productivity within the observation range.

The results are presented in table 9.2. The data show a close association between the number of ELOCs each field worker needs to serve and the number of users he or she "produces". In all study areas the number of users increases nearly proportional to the number of ELOCs.<sup>43</sup> According to the estimates (eq. 1) a 10 percent increase in the number of ELOCs is associated on average with about a 9.4 percent increase in the study areas

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<sup>42</sup> This operation can be listed under medical resources and modes of delivery

<sup>43</sup> This association yields the high "Adjusted  $R^2$ " values.

of Tangerang and Yogyakarta, and 7.8 percent in the corresponding areas in South Kalimantan. The non-linear association between number of users and ELOCs across observations is also supported by the estimated coefficients (on the number of ELOCs) in the quadratic equation (equation 2). This implies some peak, except for Tangerang, in the number of ELOCs that can be served by a field worker. Interestingly enough, in Tangerang, where the numbers of ELOCs served by field workers, are relatively high, no such peak is suggested by the data, the linear-quadratic estimates are insignificant. Still, worker productivity, measured by the number of users, increases when each worker, on the average, is assigned to larger numbers of ELOCs.

Table 9.2: Field Worker Productivity Estimates, No. of Users or Log of Number of Users as Dependent Variable

Independent Variable	TANGERANG		YOGYAKARTA		S. KALIMANTAN	
	Eq. 1*	Eq. 2+	Eq. 1	Eq. 2	Eq. 1	Eq. 2
Ln(No. of ELOCs)	0.9396 (66.53)	-	0.9358 (62.83)	-	0.7781 (9.24)	-
No. of ELOCs	-	0.6465 (24.26)	-	1.0421 (8.41)	-	0.4097 (5.78)
(No. of ELOCs) <sup>2</sup>	-	-5E-05 (-12.21)	-	-0.0002 (-6.35)	-	-
No. of children	9.70E-06 (0.28)	-	-3E-05 (-1.44)	0.1565 (1.53)	0.1391 (1.57)	0.1052 (1.17)
(No. of children) <sup>2</sup>	-	5E-05 (3.42)	-	-2E-05 (-1.68)	-	-
Availability of coconut scheme	0.0832 (2.05)	49.6565 (1.79)	-0.0425 (-0.55)	47.8554 (-0.74)	0.0866 (0.92)	47.2504 (0.83)
Availability of credit scheme	-	-	0.0331 (0.67)	-46.3409 (-1.08)	0.1221 (1.26)	58.1500 (1.00)
Availability of public works scheme	-	-	0.0445 (0.96)	44.5013 (1.11)	-0.1183 (-0.096)	-27.083 (-0.37)
% time in IEC	-0.0048 (-2.52)	-2.7302 (-3.70)	0.0058 (2.56)	-0.2661 (-0.14)	0.0001 (0.06)	1.1827 (1.32)
Adj. R <sup>2</sup>	0.99	0.97	0.99	0.97	0.99	0.89
F	27188	868	15023	325	5628	124
N	134	134	78	78	88	88

Note: t-statistics in parentheses.

+ No. of users

\* Log of no. of users

These findings, suggesting relatively slight falls in user rates as the number of ELCOs per field worker rises, are consistent with the first hypothesis. Productivity is determined by the levels of effective demand in each worker's catchment area.<sup>44</sup> Field workers appear underutilized: each worker could service larger populations than they service now.

Findings for Tangerang suggest that more can be gained if workers spend less time in promotion, and more resources are invested in consumer incentives. That is, controlling for average number of ELCOs, workers who spend more on delivery and whose populations benefit from incentives, do better on average.<sup>45</sup> This finding is reasonable in view of the relative scarcity of resources in Tangerang (chapters 5 and 6). Workers can do better by coordinating medical personnel resources, mainly because they service the larger population with the injectables, which require medical attention.

The findings for Yogyakarta suggest that IEC activity might help. But for the study areas in this region and those in South Kalimantan, the results, beyond the strong effect of number of ELCOs on worker productivity, are less

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<sup>44</sup> It must be stressed that these findings may be strongly influenced by the implicit or explicit target-setting system whereby workers may be assigned relatively fixed user rates, and report accordingly. Data about these rates (see chapter 4) suggest that absolute user rates could be lower. This might seriously hinder any evaluation of the data.

<sup>45</sup> As far as incentives are concerned, they may reward areas already achieving high rates. Hence, causality may be the opposite of that suggested by the estimates.

conclusive.<sup>46</sup>

On the whole, even if somewhat obscured by target-setting, according to these estimates, field-worker productivity appears to be basically influenced by the size of the target population, and to a much lesser degree by other factors affecting demand, IEC and promotion incentives. In this situation, consistent with the first hypothesis, additional field workers in the population would have little or no impact on output.

The model suggests that under these conditions, more workers would imply smaller catchment areas to each worker, and no consequent rise in output. To test this proposition, the effect of the number of field workers across subdistricts was estimated for each of the three provinces. Total number of users at the subdistrict level was correlated with the number of ELCOs and field workers.

The relevant regression estimates are shown in table 9.3. There is no effect of the number of workers on number of users when the number of ELCOs is statistically controlled. Even at this subdistrict level of observation, there is a close relationship between number of ELCOs and the number of users. These findings reaffirm the previous estimates at the individual field-worker level, indicating that there is underemployment of these workers. Additional workers do not increase output. In Tangerang, they may in fact

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<sup>46</sup> Because of the simultaneity bias, stemming from the effect of number of users on allocation of more time to delivery efforts, the estimated coefficients on time in IEC are downward biased. The effect of IEC may be stronger than implied by the estimates.

be associated with lower output.<sup>47</sup>

Table 9.3: Log of Number of Users as Dependent Variable,  
Regression Coefficients

Ind. Variable	Tangerang	Yogyakarta	S. Kalimantan
No. of ELCOs*	1.1988 (10.95)	0.8447 (11.92)	0.9527 (19.17)
No. of Field Workers*	-0.1808 (-1.40)	0.0136 ( 0.17)	-0.0159 (-0.21)
Constant	-1.9414 (-2.18)	1.0405 (1.040)	-0.1363 (-0.47)
Adj. R <sub>2</sub>	.90	.87	.95
F-Stat.	91	99	383
N	21	29	33

Note: t-statistics in parentheses.

\* Log of

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<sup>47</sup> This may be an attempt to boost output in low prevalence areas.

#### 9.4. Field Workers' Time Allocation

Another way to examine field worker productivity is to study their time allocation to delivery and coordination. If, as suggested by the findings just presented, demand driven by number of ELCOs is the basic determinant of each worker's scale of operations, the number of users should affect the amount of time spent in delivery ( $t_d$ ) when workers are fully employed. If this hypothesis is not borne out by the data, workers are underemployed.

A simple linear estimate has been tried in order to correlate the potential determinants of the worker's time allocation to delivery. As seen in table 9.4, no variance in this allocation can explain meaningfully. These findings too are consistent with the hypothesis that field workers are underemployed. This may also explain the observed high proportions of their time — 60-70 percent (chapter 6) — workers spend in non-delivery activities.

Table 9.4: Field Workers' Allocation of Time to Delivery  
as Dependent Variable, Regression Coefficients<sup>1</sup>

	Tangerang	Yogyakarta	Kalimantan
No. users	0.00002 (0.64)	0.00002 (0.69)	0.00007 (0.89)
Area (in Sq.)	0.00001 (1.18)	-0.00000 (-0.69)	7.28723 (0.14)
No. villages	-0.02621 (-1.20)	0.01316 (0.82)	-0.00432 (-0.42)
Worker seniority (yrs.)	0.00057 (0.46)	0.00058 (0.98)	0.00013 (0.08)
Worker education (yrs.)	-0.00644 (-1.17)	-0.00680 (-1.25)	-0.00151 (-0.11)
Constant	0.47731 (6.20)	0.31504 (4.24)	0.40613 (2.33)
Adjusted R <sup>2</sup>	0.00	0.00	0.00

Note: t-statistics in parentheses.

<sup>1</sup> The dependent variable is  $\log[p/(1-p)]$  where  $p$  = percent of time allocated to delivery.



#### 9.5. Worker Effectiveness

Under the conditions established in the previous sections, there is little or no scope for productivity gains in delivery by the individual worker. The average worker is not working to capacity because of a lack of effective demand. Clearly anything, including particular traits of workers, that can promote demand, would benefit the system. There is little theoretical or empirical knowledge of what makes family planning workers more effective in given populations. Is it their ability to promote demand? Or, is it their ability to manage delivery efforts? Alternatively, there is no knowledge of what worker attributes affect demand and what attributes affect supply, or both.

To test worker effectiveness in line with the model and the evidence presented thus far, we explore the effect of worker characteristics on their effectiveness, measured by the prevalence rate: the ratio of number of users to number of ELOCs. Those worker characteristics that make a difference in this rate across observations a priori affect demand.

The estimated equation is an extension to the previous estimates, and is based on relationship (9.2):

$$\text{Log}(U/E)_j = \sum_i a_i X_{ij} + v_j$$

where  $X_i$  is the  $i$ th characteristic of the  $j$ th worker, and  $v_j$  is a random

disturbance term. The results are reported in table 9.5.

Table 9.5: Logarithm of User Rate by Field Worker as Dependent Variable, Regression Coefficients

Independent Variable	Tangerang	Yogyakarta	S. Kalimantan
Age	-0.003 (-1.35)	-0.002 (-0.55)	0.000 (0.07)
Sex (male=1)	0.016 (0.35)	-0.124 (-2.57)	0.007 (0.10)
Marital status (married=1)	-0.127 (-1.77)	-0.029 (-0.29)	-0.001 (-0.13)
Number of children	-0.014 (-1.26)	0.011 (0.50)	-0.007 (-0.13)
Years of schooling	-0.027 (-3.74)	-0.008 (-1.18)	-0.042 (-3.37)
Using family planning (Yes=1)	0.180 (2.64)	0.056 (0.066)	0.082 (0.077)
Adj. R <sup>2</sup>	.84	.56	.74
F	111	17	40

Note: t-statistics in parentheses.

The estimated coefficients indicate that educated workers are less effective; worker effectiveness declines with level of schooling. Following the model, this suggests that relatively well-educated workers are poor promoters of family planning. There is also some indication in the table 9.4 findings that they spend less time than other workers in delivery. Hence, the hypothesized "efficiency" of the workers may manifest in their ability to realize the situation. Their effectiveness may in fact manifest in that they do not waste community resources by idle operations.

Not surprisingly, in the study areas of Yogyakarta where the IUD is common, female field workers do better than their male counterparts. There is some indication that workers in Tangerang who themselves use family planning, perform better. Other worker characteristics do not appear to make any difference to worker performance.

#### 9.6. Supervisor Productivity

Supervisors are in immediate control of field operations. It would be expected therefore that they use their prerogative to allocate field workers in a rational fashion on the basis of local potential and field worker productivity.

It was established in chapter 6 that field workers are allocated largely on the basis of ELOs and to a lesser extent on the basis of number of villages and area the field workers cover. It is expected therefore that

under general circumstances of apparent underemployment, more efficient supervisors will allocate fewer workers than their less efficient counterparts, all else being equal. To test this hypothesis, the equations on field worker allocation (table 6.2) were re-estimated with selected supervisor characteristics.<sup>48</sup>

The data show (table 9.6) that experienced and more educated supervisors in Tangerang tend to "employ" more field workers than their less experienced and educated counterparts. A similar pattern, although with less predictive power statistically, is observed in South Kalimantan. In Yogyakarta there is some evidence that more experienced supervisors employ fewer field workers.

Thus, except for Yogyakarta, the evidence does not support the hypothesis that a priori more efficient supervisors may save on field workers in a situation where there is scope to economize on this resource.

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<sup>48</sup> "Area" and "Med. Staff" were omitted because of statistical insignificance, and to economize on statistical degrees of freedom.

Table 9.6: Determinants of Number of Field Workers, by Supervisor Regression Coefficients

	Tangerang	DI Yogyakarta	South Kalimantan
Constant	-4.281 (0.281)	4.287 (0.009)	-2.982 (0.111)
Education	0.299 (0.288)	0.068 (0.364)	0.115 (0.256)
Worker experience	0.258 (0.023)	-0.095 (0.082)	0.160 (0.138)
Eligible couples	0.0003 (0.000)	0.0002 (0.036)	0.0003 (0.001)
Children per eligible couple	-2.034 (0.118)	-0.636 (0.653)	3.730 (0.006)
Villages	0.285 (0.000)	-0.102 (0.071)	—
N	18	21	27
Adj. R sq.	.89	.39	.57
F	29	4	10

Note: t-statistics in parentheses.

### 9.7. Worker Pay and Efficiency

Are there any guiding principles in setting salaries that can be eventually related to worker's productivity? To answer this question, two salary equations were estimated: one with two alternative dependent variables:

- a) the base salary, considered a salary policy variable set by BKKBN management; and,
- b) all labor incomes, including all components (salaries, per diem, travel, honoraria, other pay) which reflect work activity.

These equations conform to common wage equations which take the form:

$$\text{Log } W_j = a + \sum_i b_i X_{ij}$$

where  $W_j$  is the monthly salary of the  $j$ th worker and  $X_{ij}$  is the  $i$ th characteristic which is hypothesized to determine his or her salary.<sup>49</sup> "a" is some base salary, and "b" is a vector of coefficients relating " $X_i$ " to salary.

The estimated coefficients for field workers are reported in table

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<sup>49</sup> This function also turned out to have the best fit of several tested.

9.7.<sup>50</sup> The most important explanatory variables are education and experience.<sup>51</sup> In the base salary equation, we see that workers receive, on average, salary increases of 3.6 percent annually. We can also see that junior high school graduates earn 21 percent more than elementary school graduates; senior high school graduates earn 38 percent more; and university and academy graduates earn 30 percent more. Allowing for all sources of labor income also increases the earnings of South Kalimantan workers, who earn higher total incomes. In both equations, Tangerang workers earn marginally less than Yogyakarta workers, though the differences are not statistically significant.

When we allow for additional sources of labor income, the wage equation estimates change. The predictive power of the equation falls; the education variables become less significant in explaining wage variations.

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<sup>50</sup> Similar estimates for supervisors, did not yield any results of statistical significance.

<sup>51</sup> The zero order correlation coefficient between age and experience is 0.18. This rather low correlation suggests that BKKBN hires workers of all ages and that worker turnover may be high.

Table 9.7: Worker Salary Determinants for BKKBN Field Workers  
Log of Salary Measures as Dependent Variables,  
Regression Coefficients

Dependent Variable	Base salary	All labor costs paid by govt. <sup>a</sup>
Constant	3.263 (16.22)	3.254 (17.22)
Sex (male = 1)	0.0E-4 (-0.62)	0.073 (1.47)
Age	0.002 (0.46)	0.002 (0.35)
Work experience	0.036 (4.89)	0.046 (5.89)
<u>Education</u>		
Junior high*	0.215 (2.49)	0.137 (1.41)
Senior high	0.379 (4.23)	0.169 (1.72)
Higher education*	0.302 (1.51)	-0.020 (-0.32)
<u>Region**</u>		
Tangerang	-0.014 (-0.24)	-0.076 (-1.20)
South Kalimantan	0.147 (2.22)	0.243 (3.34)
adj R <sup>2</sup>	0.157	0.157
F	6.83	6.83
N	250	251

Note: t-statistics in parentheses.

\* Dummy variables - "primary education" excluded.

\*\* Dummy variables - "DI Yogyakarta" excluded.

<sup>a</sup> Includes travel expenses, honoraria, etc.



BKKBN's pay to its workers cannot be justified on productivity principles. But, then in this environment where workers appear to be assigned to too small populations, the effect of worker traits on productivity cannot manifest

Other labor-related incomes tend thus to equalize earnings among field workers, except for the effect of experience or seniority. This suggests that more educated workers may be investing less effort; they travel and participate less in seminars, etc. This may be further evidence that educated staff work less — an indication of efficiency under excess production capacity — and indeed be less wasteful in terms of utilizing resources, beyond their base salary.

#### 9.8. Summary

It was argued in chapter 8 that BKKBN has relatively little latitude to affect the cost effectiveness of the family planning program. The major cost component it can affect directly is the organization's own labor cost, which constitutes about one-fifth ( $1/5$ ) of the total unit user cost, and about one-third ( $1/3$ ) of the user cost immediately under BKKBN's control.

Within these limits, the data about labor productivity presented here indicate that there is scope for savings by assigning larger catchment areas, more ELOCs, to the average field worker. This would mean savings in labor

cost and would bring to bear the full potential of the field staff. More educated and experienced workers might do better than their less experienced and educated counterparts when conditions of extra production capacity are eliminated. This would also provide supervisors with more leeway to exercise some managerial control, which appears to be lacking. Supervisors engage in the same activities as field workers, and more experienced supervisors tend to mobilize more workers, contrary to what might be warranted on cost-effectiveness grounds.

## 10. PROGRAM EFFICIENCY

### 10.1. Introduction

In the previous chapter we explored ways in which BKKBN could improve the allocation and management of a resource under its direct control: family planning field workers. This, however, has been shown to be a rather narrow option to improve the effectiveness of family planning delivery because BKKBN has almost no control over capital expenditures, and by implication over infrastructure which determines to a substantial extent method mix and cost of supplies, the major recurrent cost element to the system and to BKKBN. An overall strategy that aims to increase program efficiency must consider all resources, consumer preferences, and possibly changing technology.

The question becomes: how can the Government of Indonesia increase the long-run cost-effectiveness of family planning delivery? A comparative analysis of the three study areas - which may represent three models of delivery - can help to answer this question.

It was shown in chapter 8 that for identical levels of operation, the study areas of Yogyakarta are the most cost-effective in terms of unit cost. It was argued in chapters 8 and 9 that raising scales of operations and improving allocation of workers can improve cost-effectiveness in all regions, in Yogyakarta in particular because the potential for labor savings there is highest. That is, Yogyakarta may potentially become more cost-effective, through savings on labor cost, than current data indicate.

The major issues that can explain the regional differences leading to the observed cost-effectiveness differentials must relate to the combination of three intimately related factors: consumer demand, method mix, and the delivery system. The objective in this chapter is to study the potential contribution of these factors to program efficiency through a comparative analysis of the three regions.

#### 10.2. The Consumer's Perspective

Observed output (contraceptive prevalence) levels indicate an interaction between consumer preference or demand and contraceptive availability or supply (chapter 3). No data on consumer preference was collected as part of this study. Consumer preference, however, is a major variable affecting program success, since a program is most productive when it can satisfy clients' unmet demand. To gain some understanding about the effects of this variable, we analyze how method mix relates to levels of prevalence.

We assume that where consumers have access to IUDs, they also have access to all other methods. If they choose this method, they must prefer it. Alternatively, if in areas where the use of IUD is relatively high, prevalence rates are high, this would suggest that the 'cafeteria approach' may be productive. People would respond favorably to the IUD, if available.

To examine how prevalence correlates with the ratio of users of a particular method among ELOCs, the following relationship is estimated:

$$UM_i/E = a(U/E)^b$$

where  $UM_i$  represents the users of method  $i$ ,  $U$  represents total contraceptive users,  $E$  is the number of ELOCs, " $a$ " is a constant indicating the average ratio of users of method  $i$ , and " $b$ " represents the rate of change. The estimated coefficients are reported in table 10.1.

In each region, the coefficient and the common method is approximately unitary ( $=1$ ), suggesting that prevalence rates and the user rates of the common methods change proportionately. The estimates show that IUD is the method most associated with high prevalence rates. In all regions, but especially in Tangerang and South Kalimantan where IUDs are not common, a 10 percent rise in prevalence is associated with a higher than 10 percent rise in the ratio of IUD users. The equivalent figures are 15 percent in Tangerang and 26 percent in South Kalimantan. In South Kalimantan the same holds true for injectables: a 10 percent rise in prevalence is associated with a 13 percent increase in the ratio of ELOCs using injectables. This tendency is corroborated by the data presented in chapter 4 suggesting a rise of use of injectables among new acceptors.

These data suggest that, at the margin, higher prevalence rates are positively associated with the more permanent methods in all three regions,

especially where these methods are not common. Moreover, even in Yogyakarta where the IUD is most common, the other methods are not associated with high prevalence rates.

These findings support the hypothesis that, when permanent methods are available, users tend to employ them. Moreover, the demand for permanent methods may increase with time because clients who start with pills usually will continue with a permanent method, namely, injectables, IUD, and others such as implants and sterilization, should they be available. Additional support to the preference of a permanent method can be found in the times series shown in figures 10.1 - 10.3 relating to method mix in the three study areas. It is evident that user rates of permanent methods (IUD, injectables and sterilization) rise once they are made available.

The reader must bear in mind that the study areas differ not only in medical infrastructure, but in cultural make-up as well. There are a variety of hypotheses concerning the effects of cultural factors which are far too involved to undertake in the present study. Briefly, Tangerang, which has a relatively high non-Muslim population, may be amenable to injectables, unlike the Muslims who tend to sanction its use. By the same token, the Christian population of DI Yogyakarta, who follow a more syncretic form of Islam, may be agreeable to the IUD, contrary to the Muslim population in this area, who tend to avoid its use. Education and tradition, as well as the history of the program, also have far-reaching effects. The influence of these factors merits additional data and research.

Source: BKKM Monthly Service Statistics

Table 10.1: IUD, Pill, Injectable and Total Prevalence Rates, by Region:  
Regression Coefficients

	Tangerang	Yogyakarta	South Kalimantan
<u>IUDs</u>			
Constant	-2.705 (-12.78)	-0.618 (-12.89)	-2.992 (-8.61)
U/E	1.487 (4.24)	1.059 (7.03)	2.645 (4.59)
Adj. R <sup>2</sup>	0.11	0.39	0.21
F	18.01	49.37	21.09
<u>Pills</u>			
Constant	-5.519 (-14.80)	-2.038 (-13.00)	-0.218 (-7.07)
U/E	0.972 (6.02)	0.544 (1.10)	0.902 (19.26)
Adj. R <sup>2</sup>	0.20	0.00	0.81
F	36.27	1.22	370.99
<u>Injectables</u>			
Constant	-0.467 (-9.75)	-3.030 (-22.91)	-2.650 (-14.13)
U/E	0.975 (12.92)	0.423 (1.02)	1.282 (4.50)
Adj. R <sup>2</sup>	0.55	0.00	0.18
F	167.04	1.03	20.21

Note: t-statistics in parentheses.



### 10.3. Efficiency of Method and Mode of Delivery

Because of the differences in infrastructure, and probably because of the age of program, the three study areas are markedly different in modes of delivery (see chapters 4 and 5). In Tangerang, the pill and injectable -- the most common methods there -- are largely delivered through posyandus and VCDCs. In Yogyakarta, the IUD, the most common method, is delivered through medical facilities. In South Kalimantan, the most common method, the pill, is still largely distributed by VCDCs and medical facilities (table 5.1). The scale of operation for each program is different. These differences are clearly reflected in user cost of methods in all the study areas as shown in chapters 7 and 8.

It is important to establish how much it costs to deliver similar methods through alternative delivery modes in order to identify efficient delivery mechanisms. There is, however, the problem of allocating cost to different methods when delivered by the same mode, especially when no detailed accounting data are available. To overcome this problem to a certain degree, hedonic price equations (Chernichovsky and Zmora, 1986) are estimated for each method in order to establish method cost by delivery (table 10.2). These estimates, which are combined with accounting data, are crude and should be used as general indicators.

Table 10.2: Estimated Unit Cost of Method, by Type of Cost  
(in Rps. per Month per User)

Method	Fixed cost (Statistical Estimates)	Labor cost (Accounting)	Supply cost (Accounting)	Total cost
<u>Tangerang</u>				
IUD	121 (4.39)	179 (4.78)	6	306
Pill	22 (1.24)	103 (4.30)	341	466
Injectable	19 (2.04)	22 (1.87)	306	347
Adj. R <sup>2</sup>	.44	.56		
F	15	23		
N	53	53		
<u>Yogyakarta</u>				
IUD	91 (3.97)	56 (0.84)	6	153
Pill	22 (0.40)	226 (1.36)	341	589
Injectable	460 (2.47)	924 (1.71)	306	1690
Adj. R <sup>2</sup>	.31	.06		
F	15	3		
N	90	90		
<u>S. Kalimantan</u>				
IUD	294 (3.11)	82 (0.57)	6	382
Pill	10 (0.85)	90 (5.01)	341	441
Injectable	541 (5.76)	591 (4.18)	306	1438
Adj. R <sup>2</sup>	.42	.36		
F	27	21		
N	108	108		

Note: t-statistics in parentheses.

The estimates shown in table 10.2 indicate that even when delivered in small quantities and initiation costs are comparatively substantial, the IUD in Tangerang and S. Kalimantan is the least costly method per user, largely due to low supply cost. It is least expensive in Yogyakarta, where it is delivered in large quantities.<sup>52</sup> Unlike the other methods, however, the IUD involves relatively high capital cost. The pill, by comparison, is more expensive than even the injectable in Tangerang, where the injectable is common, because of the labor and supply costs associated with pill delivery. The injectable is expensive, (as is any other method), if delivered in small quantities which is the case in Yogyakarta and S. Kalimantan.

These estimates and their implications are not affected by the differences in reported prevalence rates between alternative data sources reported in chapter 4. In table 10.3 the cost estimates for the different methods were adjusted per the method specific prevalence rates reported in table 4.2. In the first instance (center column) all costs, including those of supplies are adjusted. That is, wastage is assumed in supplies; each actual user is consuming on the average more than is allotted to him through the distribution system.<sup>53</sup> In the second instance (right col.) only labor and capital cost are adjusted. That is, each user is "assigned" supply costs as if she or he use

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<sup>52</sup> The reader is reminded that the programs in Tangerang and especially in S. Kalimantan, are younger than in Yogyakarta and therefore would be more expensive because they grow faster. The reader is further reminded that the user cost for the IUD, is not the cost of an actual insertion which would be about three times as much.

<sup>53</sup> The reader is reminded that BKKEN's statistics are based on the distribution system. That is, if there are, for example, 80 actual pill users for every 100 users implied by the cycles of pills distributed, it is assumed that each actual user, is "consuming" 1.25 cycles; 0.25 are wastage.

the appropriate supply. The index numbers suggest that the above conclusions hold almost regardless of data source on prevalence. The IUD is the least costly method in the long run. The pill and the injectable appear sensitive to scale of operation. Each of the methods is less costly where it is relatively common. In Tangerang, where the pill and injectable share comparative prevalence rates, the pill in the range of 42-47 percent and the injectable 30 percent of users (table 4.2), the injectable is by all accounts less costly to deliver than the pill.

From a financial perspective, the IUD requires government investment in appropriate medical infrastructure and staffing. This problem is somewhat less acute for the injectable which, as demonstrated in Tangerang, can be delivered in the community (at least in an urban area) at relatively low cost. Because of its relatively high supply cost, the pill will remain expensive to the government, even when it is assumed that a substantial portion of its labor and capital costs to deliver it are borne by the community through volunteers and the Village Contraceptive Distribution Centers (VCDC) network.

Table 10.3: Cost of Method per Month by Region

	Original		All cost adjusted				capital & labor costs			
	cost		ICS		DHS		ICS		DHS	
	Rps.	Ind-ex	Rps.	Ind-ex	Rps.	Ind-ex	Rps.	Ind-ex	Rps.	Ind-ex
<u>TAN.</u>										
IUD	306	100	244	100	312	100	245	100	312	100
Pill	466	152	566	233	524	168	493	201	482	154
Inject	347	113	345	141	341	109	347	142	346	111
<u>YOG.</u>										
IUD	153	100	121	100	139	100	122	100	140	100
Pill	589	385	718	593	1218	877	643	526	854	612
Inject	1690	1105	1037	856	1082	779	1155	944	1192	854
<u>S.KAL.</u>										
IUD	382	100	520	100	NA		518	100	NA	
Pill	441	115	456	88	NA		444	86	NA	
Inject	1438	376	1208	232	NA		1257	243	NA	

Source: tables 4.2, 10.2.

#### 10.4. Conclusions

A comparative analysis of the three provinces indicates that the IUD, and to a lesser extent the injectable, are methods which, if available, may be used and contribute to high prevalence.

Moreover, the IUD appears, from a cost perspective, to be a relatively cost-effective method. It requires, however, capital investment which is beyond the means and control of BKKBN. This holds true to a lesser extent for the injectable, which requires trained medical manpower, again outside the current jurisdiction of BKKBN. The relative delivery cost of the different methods are inversely related to their efficacy. Hence, the cost effective methods are also the most efficient. These methods are probably also the most efficient when their potential demographic impact is considered. The mean age of user of the IUD, pill, and injectable for Java and Bali is 32.5, 30, and 29 respectively. That is, the relatively small differences in ages between the groups, indicate that the reproductive potential and risk of pregnancy are about equal among the different user groups.<sup>54</sup>

This discussion is partial. Clearly, altering the delivery system, especially in favor of methods which require medical facilities and staff, requires two types of investment: in facility and staff, and in the cost of

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<sup>54</sup> We are indebted to S. Cochrane for suggesting this particular and essential adjustment. More data on the age distributions is needed for a more conclusive evaluation.

initiating a new method. These costs are not considered here. The data merit a detailed cost-benefit analysis, as they strongly suggest that such investments may pay off, especially because they would contribute to medical care as well.

## 11. SUMMARY AND CONCLUSIONS

### 11.1. Introduction

The study objective is to explore potential ways to improve the cost-effectiveness and efficiency of the Indonesian family planning program. The study examines resource allocation, cost, funding institutions, and output of the program at grass root level in selected regencies in three distinct provinces: West Java, Central Java, and South Kalimantan. It is based on data about the program's field operations collected during November 1986 to March 1987, and routine service statistics of the National Family Planning Coordinating Board (BKKBN). The six regencies participating in the study are case studies; they are not meant to represent the entire National Family Planning Program.

Beyond describing and measuring all program field resources and relating them to cost and output, the study has program policy implications that fall into three categories. The first deals with potential improvements in cost-effectiveness of BKKBN's field operations through allocation and management of the basic resource under the immediate control of BKKBN: its field staff. The second category concerns potential improvements in program cost-effectiveness through a broader program strategy related to all resources and agencies participating in the program. The final category deals with the issues of resource mobilization and cost recovery.



In this chapter the major study findings are summarized and their implications discussed. The chapter concludes with a note about future research.

#### 11.2. Summary

The study areas reflect Indonesia's varied and rapidly changing cultural, demographic and socioeconomic environment. Tangerang, in West Java, an area next to the capital Jakarta, is a densely-populated in-migration area. It has a high ratio of population to health facilities and other resources for family planning delivery. This area may be indicative of things to come: rapid urbanization with a lagging social infrastructure. The Yogyakarta study areas, Kulon Progo and Bantul, are more traditional agricultural areas, close to a slow-growing urban center. They have a relatively strong social infrastructure and resources for family planning. Tangerang has a substantial Chinese Buddhist population, while Yogyakarta has a Christian population.

These two densely populated areas contrast with the study areas of South Kalimantan, which are sparsely populated and have more resources per capita for family planning, but which are spread over large areas and are not easily accessible. All residents are prominently Muslims.

Understanding the political economy of the program is crucial to identifying ways to improve its cost-effectiveness. BKKEN is a coordinating agency which operates in a diverse and quickly evolving social environment.

BKKBN's options towards improving the cost-effectiveness of the program, are conditioned by four constraints: a) national administrative regulations, b) availability of medical and community resources, c) consumer demand and d) BKKBN's own budget. Regardless of area size, population, or other features which might influence resource allocation, BKKBN only has one family planning supervisor per administrative subdistrict.

The medical and community constraints concern the control of those resources used in family planning which are to a substantial degree external to BKKBN. These resources and consumer demand shape the nature of the program, exhibited in contraceptive method mix. While BKKBN can provide some advice about the supply, distribution, and administration of these resources, it exercises minimal control over them. BKKBN is using medical infrastructure controlled by the Ministry of Health. In the community, BKKBN field workers do oversee village family planning volunteer activities, but the volunteers who play a major role in outreach activities, primarily via distribution of pills and condoms, are closely associated with the local village civil administrators and leaders and thus are not entirely answerable to BKKBN. Clearly, BKKBN operates within its own budget which covers labor and supplies.

Availability of medical infrastructure per eligible couple (ELCO) varies greatly between regions. One health center is available for about 9,500 eligible couples in Tangerang. This is twelve times the ratio of population to health facilities in the Kulon Progo regency of DI Yogyakarta, and fifty-five times that in the sparsely-populated Tapin province of South Kalimantan.

Medical personnel are also unevenly distributed.

Distances to facilities are short in Tangerang and long in South Kalimantan. These differences correlate with modes of delivery and mix of contraceptive methods. Hence, different regions possess very different medical resources available for family planning. BKKBN adapted to this differential allocation in spite of its potential influence of modes on delivery and method mix.

Considerable variations are observed across regions in the allocation of EKKBN staff in relation to their jurisdictions. Tangerang has the highest ratio of eligible couples to all personnel types. There are above 1400 ELOCs per field worker in Tangerang, compared with 1200 in Yogyakarta, and about 900 in South Kalimantan. This suggests the program's inability to respond quickly enough to rapidly changing demographic conditions.

At the same time, within each of these provinces, labor BKKBN's staff allocations appear to be based on rational decision-making: allocation of field workers is on the basis of ELOCs, villages and size of catchment area. This is less the case in DI Yogyakarta and more so in Tangerang where resources are relatively stretched. Such a situation suggests that local managers are more responsive to objective criteria of need in allocating scarce resources than central management. Where need is more pressing, as in Tangerang, responsiveness is greater than where it is not, as in Yogyakarta. There is also evidence that senior and educated supervisors tend to oversee more field workers than do their junior and less-educated peers.

Workers basically mirror their target population and the age of the program. DI Yogyakarta has a larger share of workers who are older, female, more experienced, and better-trained.

Time allocation for both field workers and their supervisors is mainly divided between demand generation, supply, and administrative activities. This is similar across regions. BKKBN staff spend most of their time on demand generation: search for new acceptors and promotion activities. The staff report working "by the book", which gives rise to the hypothesis that on the whole they may be underutilized. They do not seem to be under obvious pressure to respond to local variations in need. If there is such pressure, it may exist in Tangerang. Medical staff spend about one-quarter of their time in family planning activities.

There is a positive correlation across study areas between levels of all types of resources provision per eligible couple. The implication is that availability of medical infrastructure, which is not under the control of BKKBN, may be a key factor in the development and nature of the program: BKKBN allocates more of its own resources where medical infrastructure is more available.

The different environments and relative availability of medical resources, as well as program age, are reflected in prevalence rates and method mix. According to BKKBN's service statistics, both Tangerang and the South Kalimantan regencies have contraceptive prevalence rates of approximately 60 percent.

Injectables, however, predominate in Tangerang and pills in South Kalimantan. The Yogyakarta regencies have the highest prevalence rates, around 80 percent, and IUDs are the most common method. Levels of prevalence data used in this study (from BKKBN sources) are higher than those from available survey data. Both types of data, however, lead to the same implications because method mix information is consistent between all data sources.

Modes of delivery are closely related to contraceptive methods. In all regencies surveyed, more than three-quarters of pills are delivered through the Village Contraceptive Distribution Centers (VDC), followed by clinics and outside-clinics. The amount of pills delivered through private sector channels is negligible, but is highest in Tangerang, where availability of program facilities per eligible couple is lowest. In the three South Kalimantan regencies, where the pill is most common, a greater proportion of pills is delivered through the clinics and outside-clinic activities than in other regencies. The two DI Yogyakarta regencies each deliver over 92 percent of all pills through the VDC. This phenomenon is consistent with the hypothesis that medical infrastructure is important for new programs even when no clinical intervention is required. In Indonesia, a medical check-up is required for new pill acceptors.

Condom delivery is quite varied among the locales surveyed. In Tangerang, the only regency where private sector channels play more than a minor role, virtually all condoms are delivered through private pharmacies. The number of condoms delivered, however, is the smallest of all the surveyed regencies. In DI Yogyakarta condoms are delivered almost exclusively through the VDCs. In

the Barito Kuala and Tapin regencies of South Kalimantan, clinics deliver over half the condoms, VDCs one-third, and the remainder are provided by outside-clinic staff.

Outside-clinic activities are responsible for 57 percent of injectable distribution in Tangerang, the regency with the heaviest injectable use. Clinics deliver most of the remainder. In all other regencies surveyed, injectables are delivered predominantly through the clinics, followed by outside-clinic activities and private sector channels.

The value of all resources allocated to family planning delivery ranges from about 270 Rps. per month per ELCO in densely-populated Tangerang to 630 Rps. in sparsely-populated South Kalimantan. BKKBN manages to mobilize, on the average, an additional one rupiah from other government and community agencies, for each rupiah it invests in its field operations. The ratio would fall if BKKBN's administrative overhead costs were included. These figures reflect the finding that on the whole, BKKBN bears about 50 percent of family planning delivery costs, the Ministry of Health about 40 percent, and the community the remaining 10 percent. BKKBN bears less of the cost burden in areas where there is medical infrastructure, because it does not pay full labor value for medical personnel and can rely on longer lasting and less costly methods, notably the IUD. It is noteworthy that physicians and other medical staff, who report spending roughly 20 percent of their time on family planning activities, receive only 8 percent of their government income from BKKBN.

Data on prevalence and data on resource allocation were combined to estimate the cost to service a user in each of the study areas. It is costliest (900 Rps. per month) to maintain a user in South Kalimantan. It is half that cost in Tangerang, the least costly area. The figures are higher and the discrepancies wider when survey data are used instead of BKKBN data. In all regions, especially those of South Kalimantan and Yogyakarta, scale of operations is a crucial variable influencing user cost. When scale of operation is controlled for and variable and marginal user costs are examined, Yogyakarta is the least costly type of program.

The structure of user cost underscores the complex nature of the political economy of the family planning program, and the rather limited scope available to BKKBN to improve the program's cost-effectiveness. The major user cost component borne by the agency is supplies, about two-thirds of BKKBN's cost in its field operations. This cost element is almost entirely influenced by method mix which, in turn, is to a substantial degree set by availability of medical infrastructure and personnel, and consumer demand.

BKKBN has control over its labor cost, about one-fifth of total recurrent cost of field operations, or one-third of its own cost in these operations. This means that the agency responsible for family planning activity appears to have rather limited latitude in terms of its own cost control, let alone the cost of the entire program.

The productivity of BKKBN staff is therefore the basic cost-effectiveness

element under the agency's immediate control. BKKBN appears to raise staff productivity by having the average field worker run a larger operation. Since workers seem to operate under conditions of excess capacity, their catchment areas can be raised with no loss in production.

More field workers in the average jurisdiction does not correlate with more output. A comparison of Tangerang and Yogyakarta is fruitful. Yogyakarta appears to be relatively "saturated" with field workers, so that their time allocation does not appear associated with productivity: the allocation of field workers' time to coordination, IEC and administrative tasks cannot be explained in a systematic way.

There is some indication that workers may be more productive in areas where there are more children below age five per ELCO. Taken at face value, the data suggest that labor productivity is determined by number of ELCOs. Of course, this may be a statistical artifact: in an administrative framework where targets are set, workers may report according to these targets.

Comparative analysis of the study areas indicates that the IUD and the injectable are methods which, if made available, would be popular and contribute to high prevalence, assuming that cultural and religious conditions shaping consumer demand do not restrict its use. Data about new acceptors suggests that the injectable is increasing in popularity.

The IUD is also relatively cost-effective: . cause of relative low long run supply and maintenance cost. It is followed by the injectable. These



methods are probably also the most efficient when their efficacy and potential demographic impact is considered. The mean age of users of the IUD, pill, and injectable for Java and Bali is 32.5, 30.0, and 29.0 respectively. That is, the relatively small age differences between the groups, indicate that their reproductive potential and risk of pregnancy are about equal.

### 11.3. Implications

BKKBN has limited scope to alter the nature of the program in any particular area under current family planning technology and the program's political economy.

Major gains in cost-effectiveness can be brought about in the long run primarily through altering contraceptive method mix in favor in the more permanent methods on which this study is focused, the IUD and the injectable. Method mix affects the program's major cost component — cost of supplies — which even if managed by BKKBN, is not determined by the agency because method mix is influenced strongly by medical infrastructure. Cost-effective gains can be achieved by a strategy that combines investment in infrastructure, adoption of new family planning technology and modes of delivery, and influencing consumer demand.

Within this general constraint, the study suggests several ways BKKBN might improve the cost-effectiveness of its operations and incur savings through modification of its target-setting policy, allocation of field workers,

and improvement of workers' time use.

First, the effects of target-setting are observed throughout the analysis. Numbers of users closely parallel numbers of eligible couples, a relationship unlikely to be so exact in a program lacking targets. Empirically, field worker characteristics fail to correlate with output levels. This is exceptional, because one would likely predict that staff characteristics, such as education, age, and years of experience, would relate with contraceptive output. The lack of such association may be a function of target-setting, where field workers habitually report their targets. Those failing to achieve their targets may misrepresent their performance by reporting higher figures, whereas those who could potentially achieve higher levels than what is targeted may only achieve expected norms.

Second, taken at face value, the data strongly suggest that field workers can be assigned larger target populations, even in areas where their presence matters on the margin (as in Tangerang and South Kalimantan). That is, present prevalence levels can be maintained with fewer field staff, or more feasibly, that new field workers need not be added even as populations of eligible couples grow.

It appears that BKKBN allocates its main resource, field workers, in a relatively uniform fashion across regions, without particular attention to productivity. In areas where the program is well-established and not too dependent on outreach activity, as in Yogyakarta, savings may incur by reducing the BKKBN's field staff, and limiting their activity to IEC. In these areas,

the cost of outreach activity is high because it serves a rather limited number of users, and the cost of pills and injectables - typical outreach methods - is relatively high.

Income-generating schemes serve areas with high prevalence rates, like Yogyakarta. Such a policy is consistent with the idea of rewards rather than inducement. There may be scope to transfer these funds as incentives in low prevalence areas, especially if there is excess production capacity and the potential for worker productivity is higher.

A long-term cost-effectiveness strategy must be considered within the context of the political economy of the Indonesian health and family planning system. The health infrastructure required to deliver efficient methods is not under the control of BKKBN, but under the Ministry of Health and other government agencies. A cost-effective strategy would thus require that both BKKBN and Ministry of Health inputs be well coordinated. The relevant strategy and policy changes would necessitate that fundamental decisions be made outside BKKBN as part of a wider welfare decision-making process.

While IUD delivery incurs low recurrent cost in labor and supplies, this method demands relatively high investment in infrastructure, personnel and start-up costs. Even if consumers pay the full cost of IUD use, including recurrent capital cost, the private sector cannot be expected to finance at the outset the investment required to support IUD. This argument is even stronger considering that private health facilities would be placed in the position of serving community health needs. Although the IUD represents the

most cost-effective and efficient method, the public sector will still need to provide many of the inputs required to support it.

The proposition that the government supports clinically-based methods, at least in financing the investment, would be less acceptable on economic grounds in sparsely-populated areas such as South Kalimantan, although on moral and political grounds of equity there is a need to do so. There the injectable would be appropriate in the long-run as a relatively efficient method. This would require government support for training personnel. BKKB's recent moves to hire medically trained field personnel who can deliver the injectable and possibly the implant, is certainly a cost-effective move. It provides for an outreach program not based on the pill, on the one hand, and not on medical infrastructure, on the other hand.

These arguments do not suggest that the government should refrain from supporting non-clinical methods, at least in the short run, given favorable conditions.

The study findings can help deal with some issue of shifting some of the financial burden of the program to the community, as implied by the KB Mandiri or privatization idea adopted by BKKB. These considerations include the cost recovery potential of the fee, and its impact on equity and prevalence or program efficiency.

The community bears about one-tenth of total delivery costs, a share that increases in outreach activity. The pill and the condom are delivered for

BKKBN almost exclusively through volunteer outlets. The burden on the community is somewhat less in the case of the injectable because of the involvement of medical personnel. The contribution of the community is least in the case of delivery through medical facilities, such as in the case of the IUD or even the pill in South Kalimantan. The estimated monthly cost to service a pill user ranges from about 450 - 600 Rps. Most labor and capital cost are borne by the community. The larger share in cost of pill delivery, however, lies in its supply. Supplies' costs account for some 60 to 80 percent of total cost.<sup>55</sup>

Under program privatization, entrepreneurs would have to bear labor and space costs currently borne by the volunteers or the community. The price they charge for contraceptives would need to embody these costs. That is, even if clients pay the full cost of the pill (and condom), the net cost recovery from the community would be less than 100 percent in view of the community's current contribution. Any subsidy, most likely of supplies, would even further reduce net cost recovery from the community. A subsidy in the range of 10-30 percent, by conservative estimates, might not amount to a net cost recovery because this cost is currently borne by the community in the case of the pill. It would merely constitute a shift of income from government to entrepreneurs.

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<sup>55</sup> Another social efficiency consideration not discussed here is foreign exchange. While Indonesia currently receives pills and condoms as donations to encourage provision of these methods, this may not be the case in the future. These methods would then also become a foreign exchange burden. One should note, however, that only minimal numbers of pills and condoms are bought from foreign assistance.

There are additional considerations. As the program now stands, at least in the study areas, each community should possess a VCDC regardless of its physical, social, or economic environment. Under a private system, entrepreneurs may be able to make a profit in some communities but not in others. In this case, communities would receive differential advantages. Those living in poor communities would either have to bear the cost of traveling to wealthy communities to receive their pills and condoms (provided they were available within a reasonable distance), bear the time cost of waiting for the monthly posyanju visit, or opt to do without. This lack of availability, however, could spur clients of poorer communities to use more permanent methods.

Privatization may differentially affect entire regions if the pill requires a fee and the IUD does not. DI Yogyakarta, a province with high IUD use, would be less penalized by a shift to payment for pills and condoms than South Kalimantan, with its high pill use. Since DI Yogyakarta already enjoys advantages (particularly with regard to health infrastructure), assessing fees for pills and condoms, rather than IUDs, would increase its privileges even further. Charging for pills and not IUDs could aggravate regional disparities.

Assessing a fee for non-clinical methods, while continuing to subsidize clinical methods, should have the effect of motivating clients to use the latter. Since permanent methods are cost-effective, this shift could clearly help improve program cost effectiveness. It may, however, not provide much by way of cost recovery for the government, since it would have to furnish health facilities and personnel to meet increased demand. As there is a shortage of medical resources in rural and remote areas in Indonesia, an expansion of

demand for clinical methods may run up against those shortages.

Consequently, in spite the government's intention to continue to subsidize costs for those unable to pay, privatizing pills and condoms could negatively affect the decision of those on the economic margin and young users to continue to use contraception. The consequences of a general policy to recover cost from non-clinical methods might have adverse consequences both in terms of equity and prevalence.

The cost recovery potential of IUD is higher than the pill's. First, the community's contribution in IUD delivery is minimal: any charge for IUD delivery would therefore entail a net shift of burden from the government to the community. Second, the IUD is used by older and presumably better-off people who may have a low price elasticity of demand, and who live close to health centers. There is an additional reason: IUD fees are collected in clinics and may be applied toward financing community health facilities, whereas the pill is largely sold by non-medical outlets.

No single universal cost recovery strategy may be appropriate across Indonesia. Fee-setting may be appropriate for Yogyakarta for all methods, with different reasons for each. Privatizing pill delivery may be most effective in areas like Yogyakarta, where it is expensive because a few are served, and those few have other more efficient and effective options if they wish and can use them. Loyal users of a particular method may, in fact, have low price elasticities (and high cost recovery potential). The reasons for a fee for the IUD were mentioned above. There may also be scope for charging fees

for condoms and pills sold in medical facilities, as is relatively common in South Kalimantan. This would discourage expensive use and delivery of methods that do not require these facilities. It would simultaneously encourage use of IUD, and to a lesser extent injectables, that require such facilities.

#### 11.4. Future Research

The study clearly opens a broad research agenda. While the study is based on its own data collection efforts, it is clear that the analysis could have been based on a lightly modified data collection system than BKKBN's current system, and an appropriate analytic infrastructure. The issues and implied programmatic changes, all merit more focused research. Operations research into the allocation and activities of field workers would be high on the agenda.

A crucial element clearly missing in the data is the consumer's perspective. No strategy and programmatic change, especially concerning cost recovery, can be adequately assessed without regard to consumer response, especially in the diverse and fast changing demographic, economic and cultural environment of Indonesia.



## BIBLIOGRAPHY

Ananta, A. and Molynoux J., "Population Dynamics in Jakarta: Its Impact on Food Needs", Unpublished paper. 1987.

BKKBN, Master List: Bulan Nopember 1986, Biro Pencatatan dan Pelaporan. Jakarta: Badan Koordinasi Keluarga Berencana Nasional, Jakarta 1986A.

BKKBN, Hasil Pendataan PUS dan Peserta KB Bulan Oktober-Nopember 1986, Biro Pencatatan dan Pelaporan. Jakarta: Badan Koordinasi Keluarga Berencana Nasional, Jakarta, 1986B.

Biro Pusat Statistik, Survei Prevalensi Indonesia 1987: Laporan Sementara, Jakarta: Central Bureau of Statistics, 1988.

Chernichovsky, D. and Meesook, O., Regional Aspects of Family Planning and Fertility Behavior in Indonesia, World Bank Staff Working Paper No. 62, Washington, D.C., 1981.

Chernichovsky, D. and Zmora I. "A Hedonic Prices Approach to Hospitalization Costs", J. of Health Economics, 5: 179-191, 1986.

Chernichovsky, D., Lerman C., and Rahardjo P., "Choice of Family Planning Method among Field Workers and its Impact in the Population". Mimeo. Jakarta. 1988.

Chernichovsky, D. and McLaughlin R., "Cost Recovery, Efficiency and Equity in Family Planning Delivery: A Proposal for a Work Program". Mimeo. IPPF. New York, 1988.

Chernichovsky, D., "Cost and Cost Effectiveness in Family Planning; Theoretical Considerations and Practical Guidelines" Processed, 1990.

Easterlin A.R. and Crimmins M.E. The Fertility Revolution: A Supply-Demand Analysis. University of Chicago Press, Chicago & London, 1985.

Freedman, R., Siew-Ean K., and Bordan S., Modern Contraceptive Use in Indonesia: A Challenge to Conventional Wisdom, Scientific Reports, International Statistical Institute, No. 20 March, 1981.

Haryono, S., and Shutt, M., "Strategic Planning and Management of Population Programmes: An Indonesian Case Study," Monograph Prepared for the Eleventh International Conference of the International Council on Management of Population Programmes, Beijing, 1988.

Hugo, G., "New Conceptual Approaches to Migration in the Context of Urbanization: A Discussion Based on Indonesian Experience," Revised draft of a paper prepared for a seminar on "New Conceptual Approaches to Migration in the context of Urbanization" organized by the International Union for the Scientific

Study of Population's Committee on Urbanization and Population Redistribution, Bellagio, 1978.

Hugo, G., "Indonesia: Patterns of Migration to 1971," in Migration and Development in South-East Asia: A Demographic Perspective, edited by Robin J. Pryor, OUP, pp. 173-221, 1979.

Hugo, G., Hull, T., Hull V., and Jones G., The Demographic Dimension in Indonesian Development, Oxford University Press, Singapore. 1987.

Hull, T., "Changing Patterns of Marriage," Research Note 74, The Australian National University International Population Dynamics Program, May 1987.

Hull, T., and Dasvarma, G.L. "Fertility Trends in Indonesia 1967-1985," Bulletin of Indonesian Economic Studies, Vol. XXIV, No. 1, April 1988.

Hull, T., and Bhakta G., "Multivariate Analysis of Infant and Child Mortality in Java and Bali," Research Note 27, The Australian National University International Population Dynamics Program, September 1984.

Hull, T., and Hull, V., "Health Care and Birth Control in Indonesia: Links Through Time," Research Note 53, The Australian National University International Population Dynamics Program, March 1986.

Hull, T., and Hull, V., "Population Change in Indonesia: Findings of the 1980 Census," Bulletin of Indonesian Economic Studies, Vol. XX, No. 3, December 1984.

Hull, T., Hull, V. and Singarimbun, M., Indonesia's Family Planning Story: Success and Challenge, Population Bulletin, Vol 32, No. 6, November 1977.

Judd, M., Kaders in Indonesia, USAID. Jakarta, 1987.

Lawrence International Ltd., Long Term Family Planning Strategy Final Report, Jakarta, 1988.

Lerman, C., Moeljodihardjo, S., Pandjaitan, S., and Molynoux, J., "Assessing the Net Correlation of Family Planning Program Inputs With Indonesian Contraceptive Prevalence and Method-Specific Use Rates", Studies in Family Planning, 20:1. 1989.

Population Reference Bureau, World Population Data Sheet, 1988.

Prescott, N., Carlson, B., Bongaarts, J., and McNicoll, J., Indonesia: Trends in Fertility and Contraceptive Prevalence, World Bank Report, Washington, D.C. 1986.

Rietveld, P., "Urban Development Patterns in Indonesia", Bulletin of Indonesian Economic Studies, Vol. 24, No. 1, April 1988, pp. 73-96.

Sinquelfield, J., and Sungkono, B., "Fertility and Family Planning Trends in

Java and Bali." International Family Planning Perspectives, Vol. 5, No. 2, June, 1979, pp. 43-58.

Streatfield, K., "A Comparison of Census and Family Planning Program Data on Contraceptive Prevalence, Indonesia." Studies in Family Planning, Vol. 16, Number 6/Part I, Nov/Dec 1985, pp. 342-349.

Streatfield, K., Reliability of BKKBN Prevalence Statistics: A Comparison of BKKBN and Census Figures. Gadjah Mada University, Population Studies Center, Yogyakarta, 1984.

Streatfield, K., and Larson, A., "The 1985 Intercensal Survey: Infant and Child Mortality Levels." Research Note 14CS, The Australian National University International Population Dynamics Program, Canberra, 1987.

Suharso, A. Jr., Redman, H. and Husain, I., Rural and Urban Migration in Indonesia, (National Institute of Economic and Social Research), Jakarta, 1976.

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